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H.Q. 54 (EA) SIGNAL SQN.

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A/26/GS *Trg Publications*/3033

AP No. 3395 (Pam 7) (Revised)

ARMY CODE No.

70273 (Pam 7)
(Revised 1974)

NUCLEAR, BIOLOGICAL AND CHEMICAL DEFENCE TRAINING

PAMPHLET NO. 7

(Revised)

THE ORGANIZATION OF UNIT NUCLEAR, BIOLOGICAL AND CHEMICAL DEFENCE

This pamphlet supersedes NBCDT Pamphlet No. 7 "The Organisation of Unit Nuclear, Biological and Chemical Defence" (Army Code No. 70273 (Pam 7)/AP No. 3395 (Pam 7), 13 October 1969.

By Command of the Defence Council

Michael Cary

MINISTRY OF DEFENCE,
1974

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Amendment Number	By whom amended	Date amended

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(*See Catalogue of Army Publications, Part II*)

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T and AVR	Scale C
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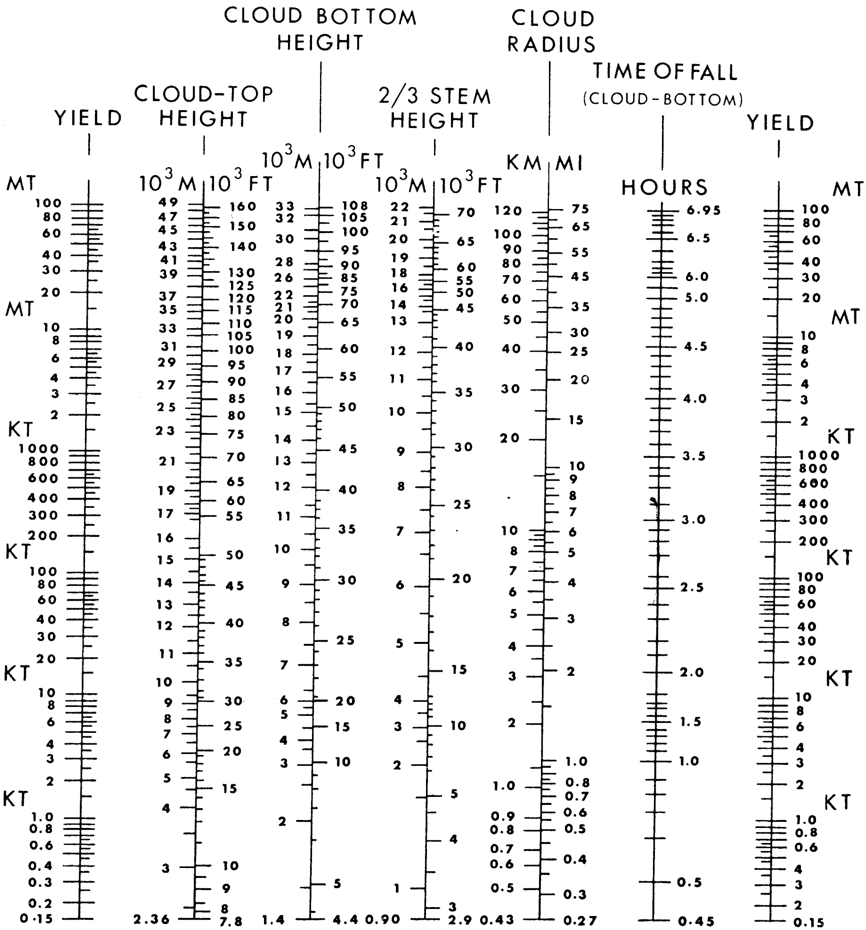
Royal Marines	120 copies

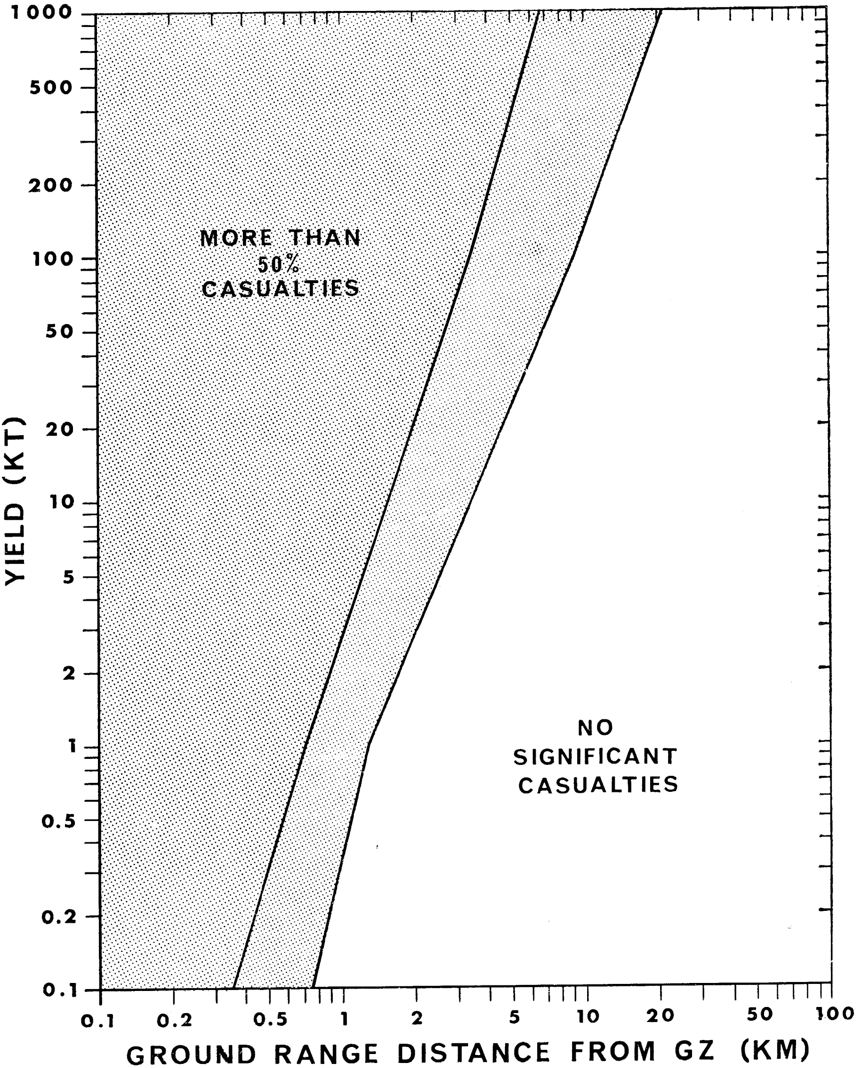
(*In accordance with AP* 113A, *Appendix T*)

Royal Air Force	800 copies

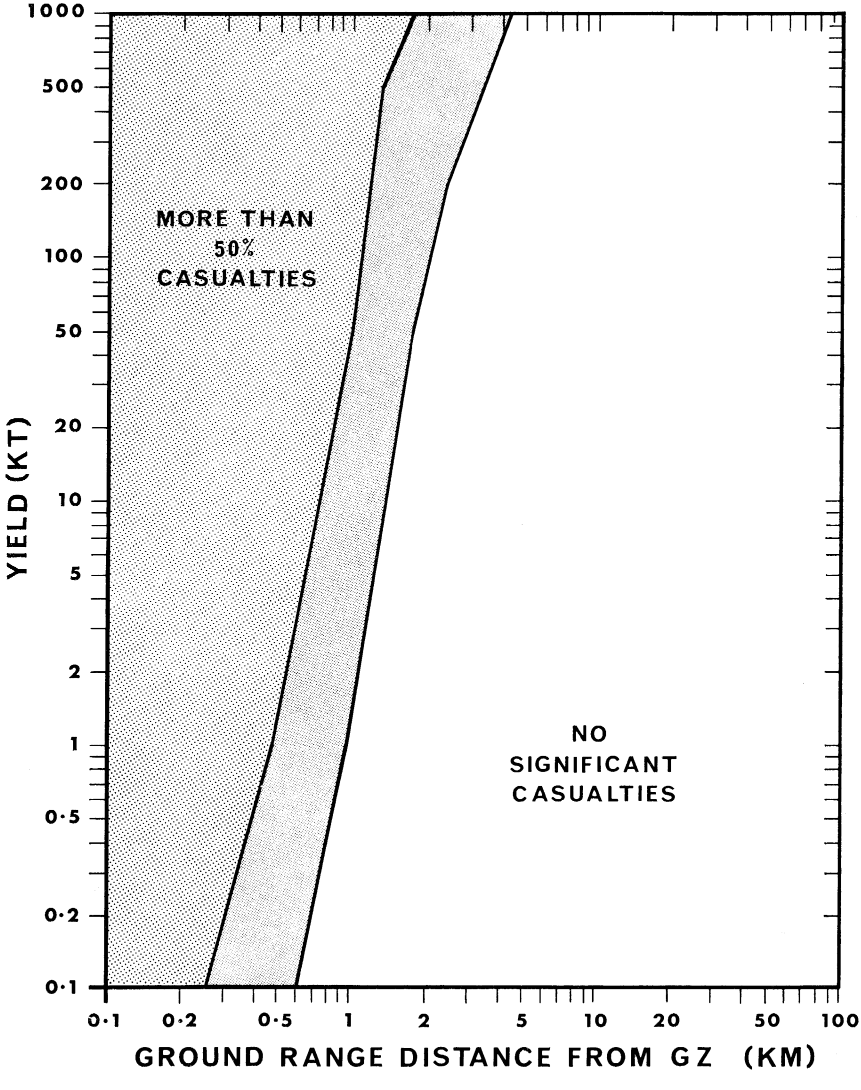
STABILIZED CLOUD AND STEM PARAMETERS



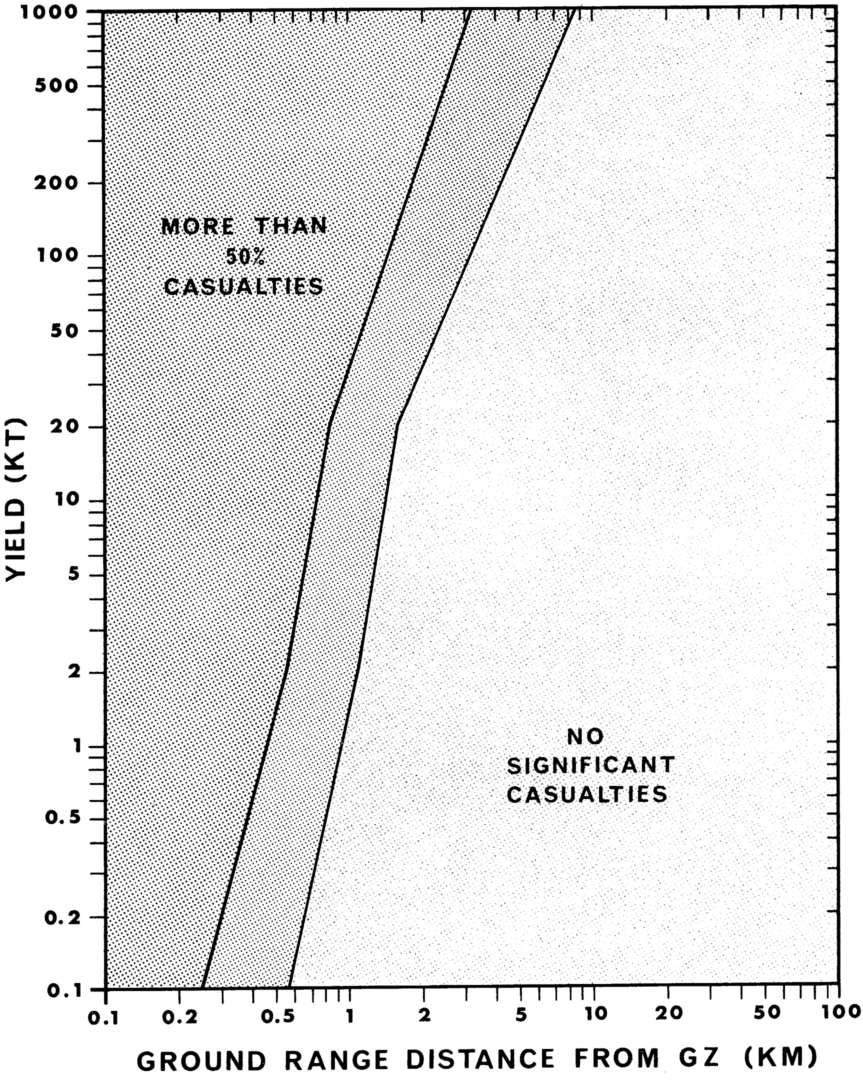
MEN IN THE OPEN WITH NO THERMAL PROTECTION



MEN IN HEAVILY ARMOURED TRACKED VEHICLES CLOSED DOWN

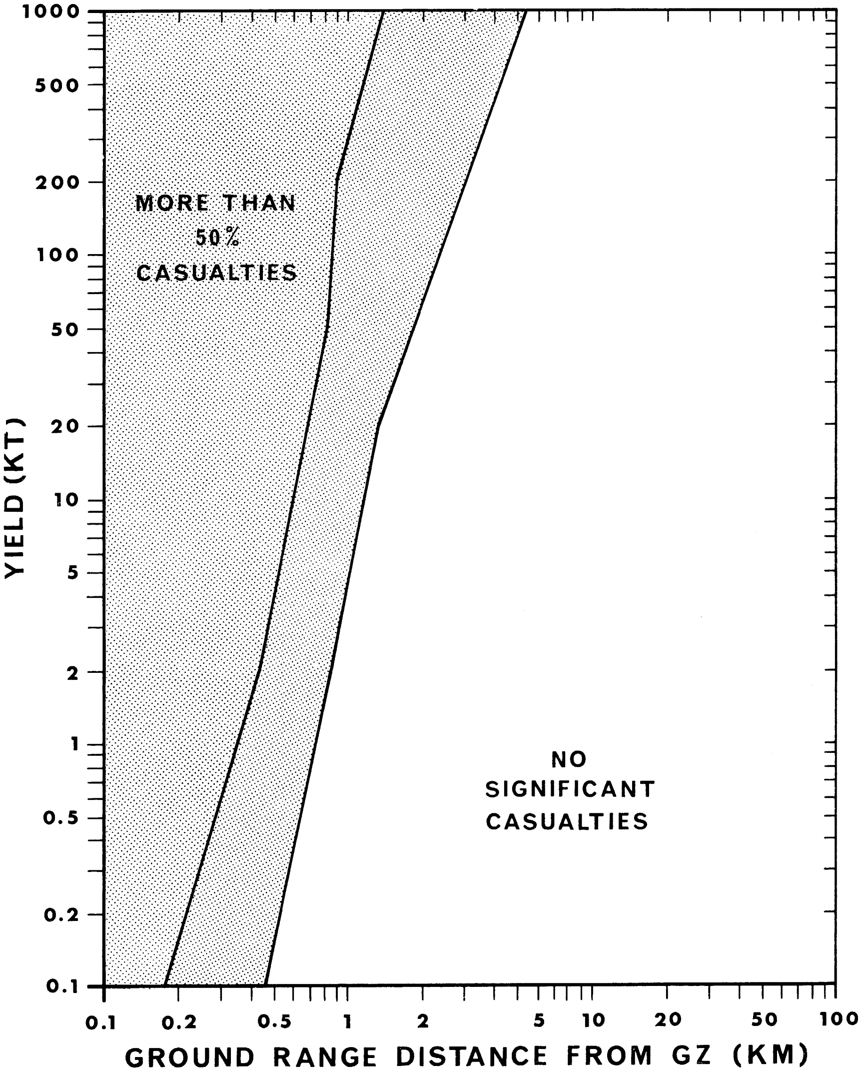


MEN IN OPEN SLIT TRENCHES

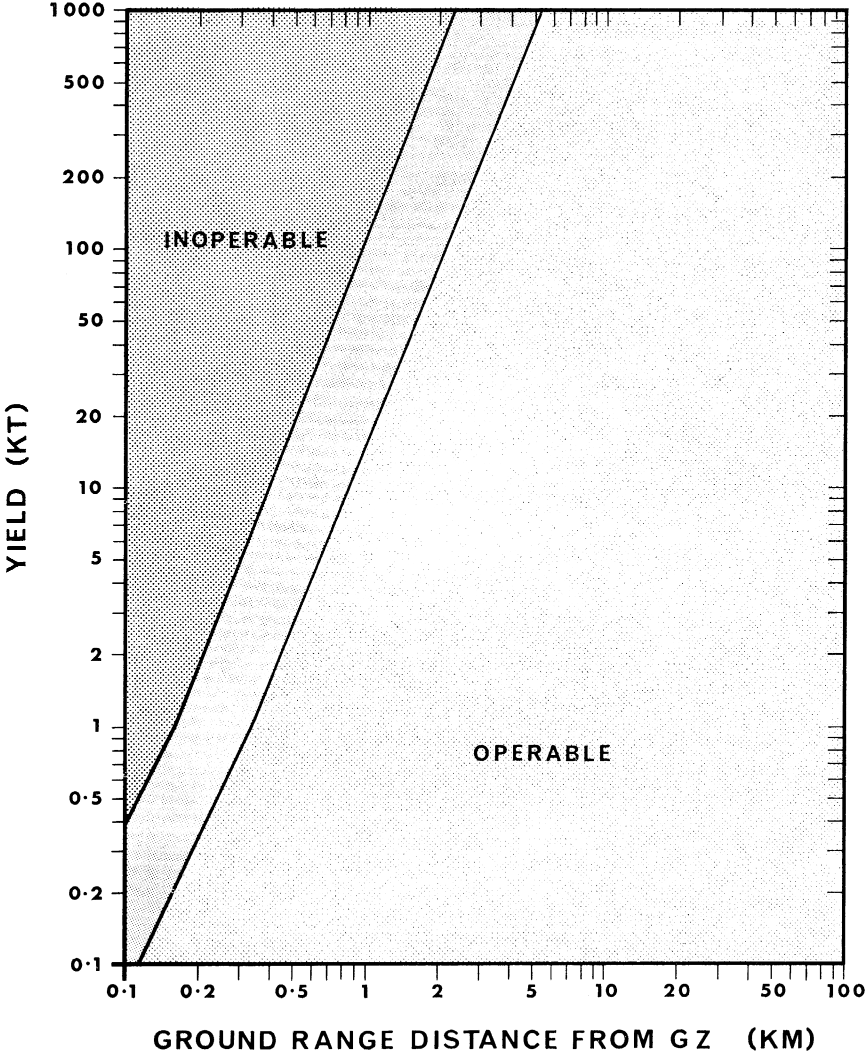


APPENDIX 10 TO ANNEX K

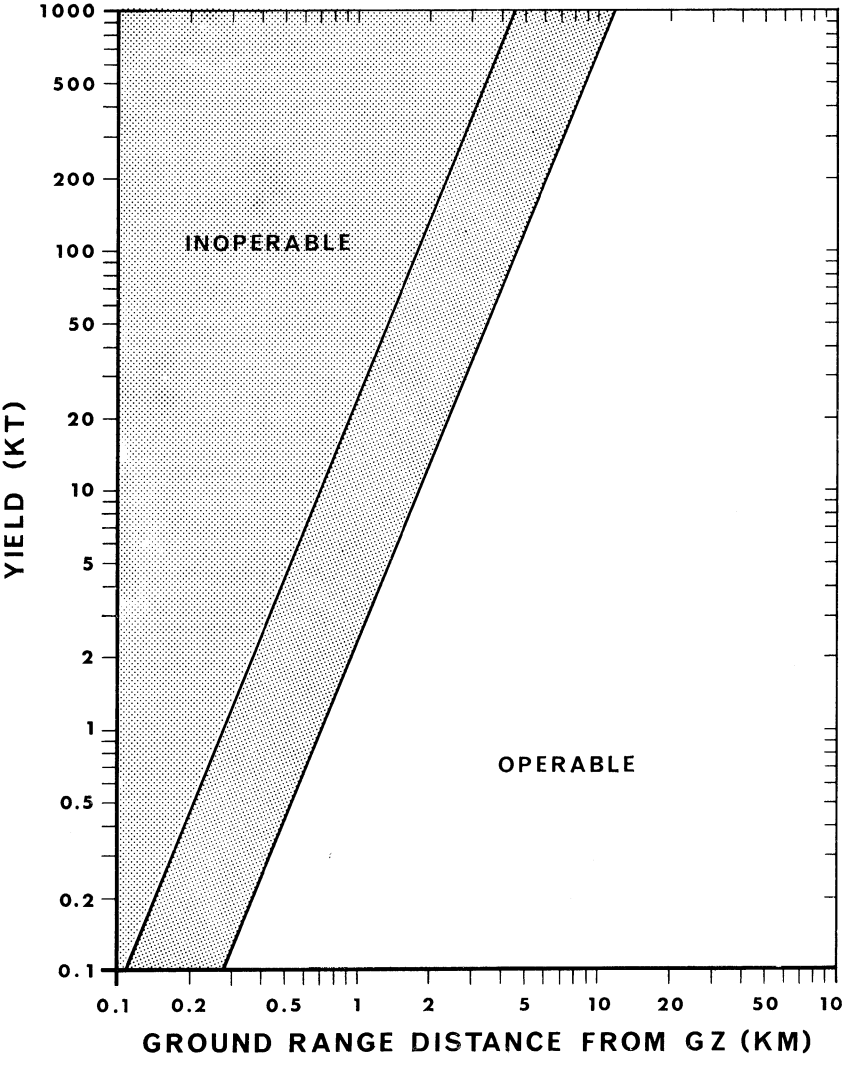
MEN IN SLIT TRENCHES WITH 30 CMS (12 INS) EARTH COVER



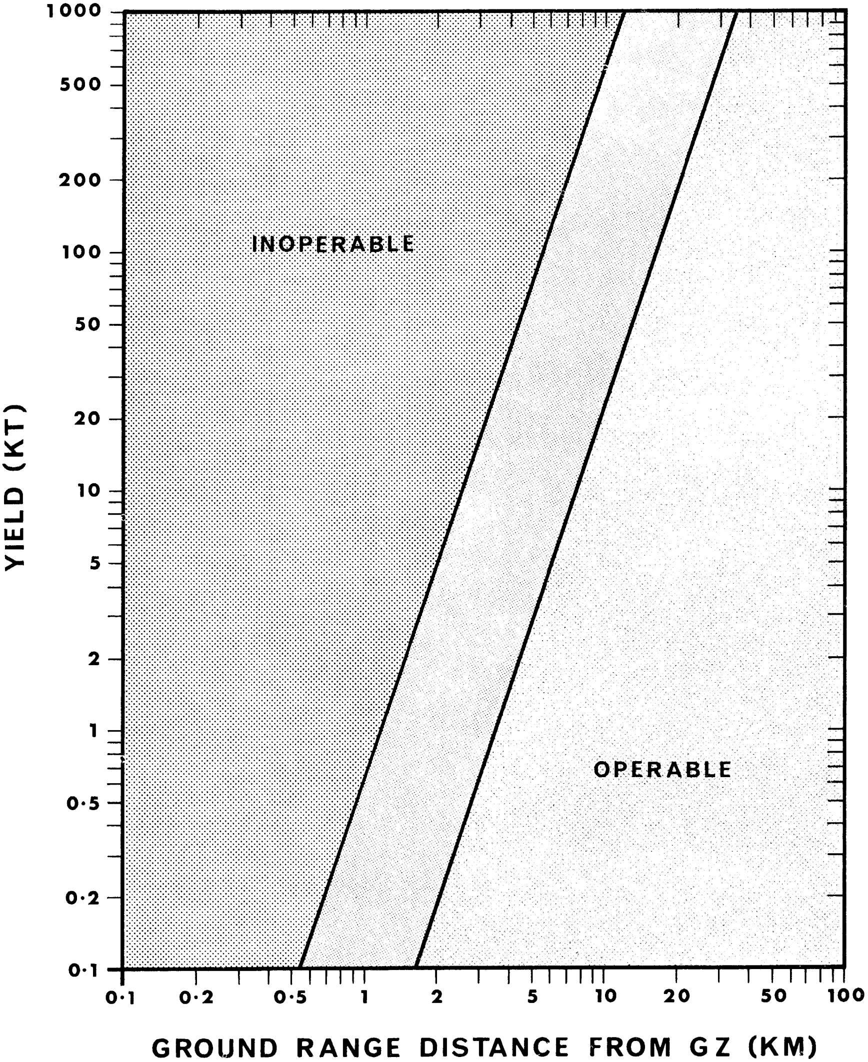
HEAVILY ARMOURED TRACKED VEHICLES



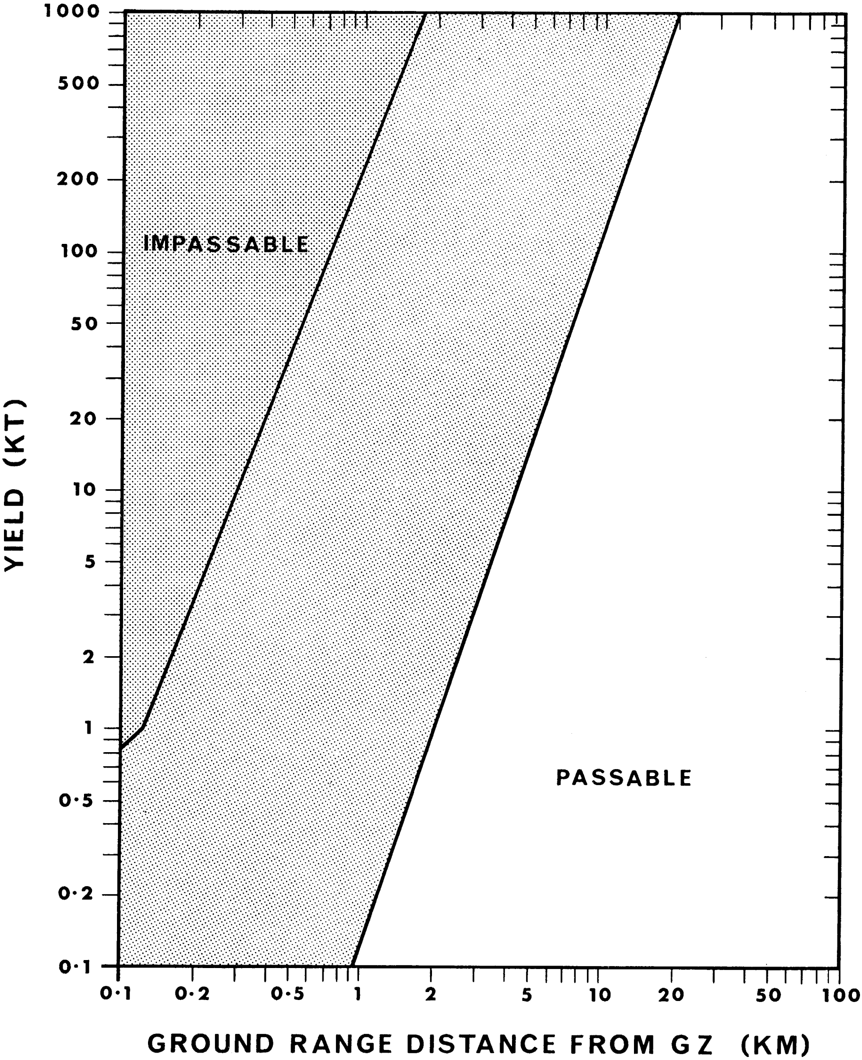
MOBILE SUPPLY DUMPS



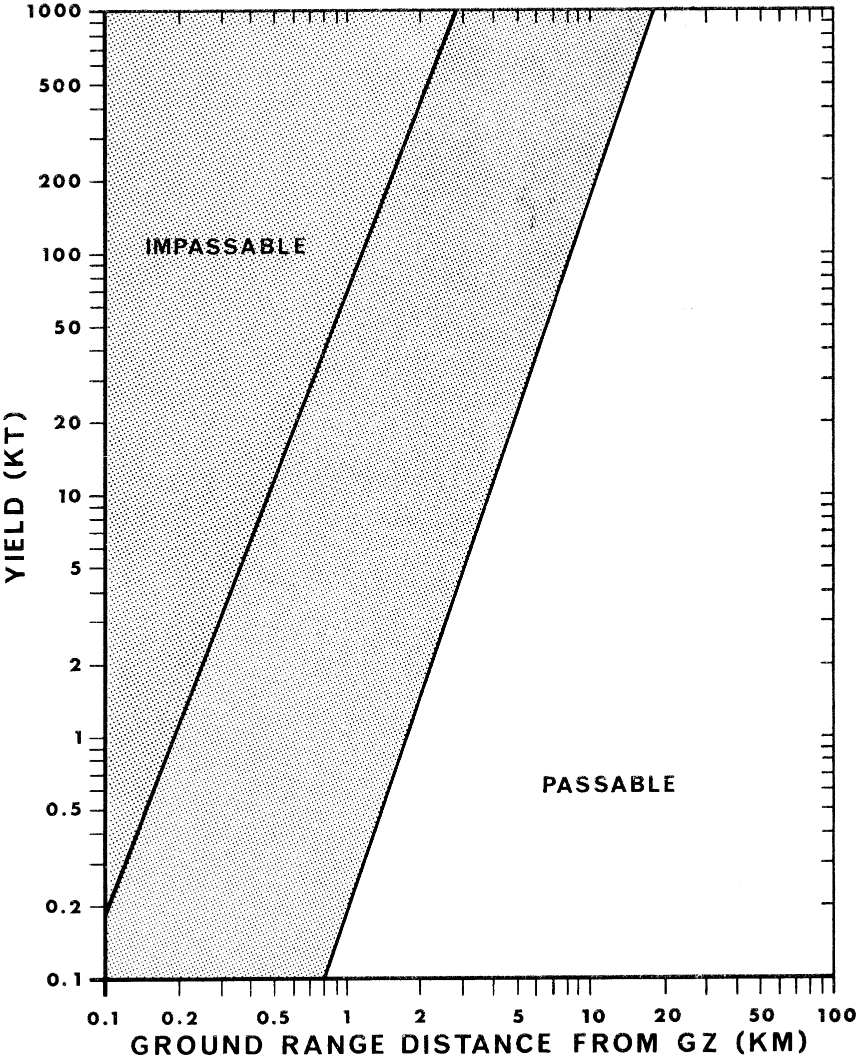
HELICOPTERS AND LIGHT AIRCRAFT ON THE GROUND



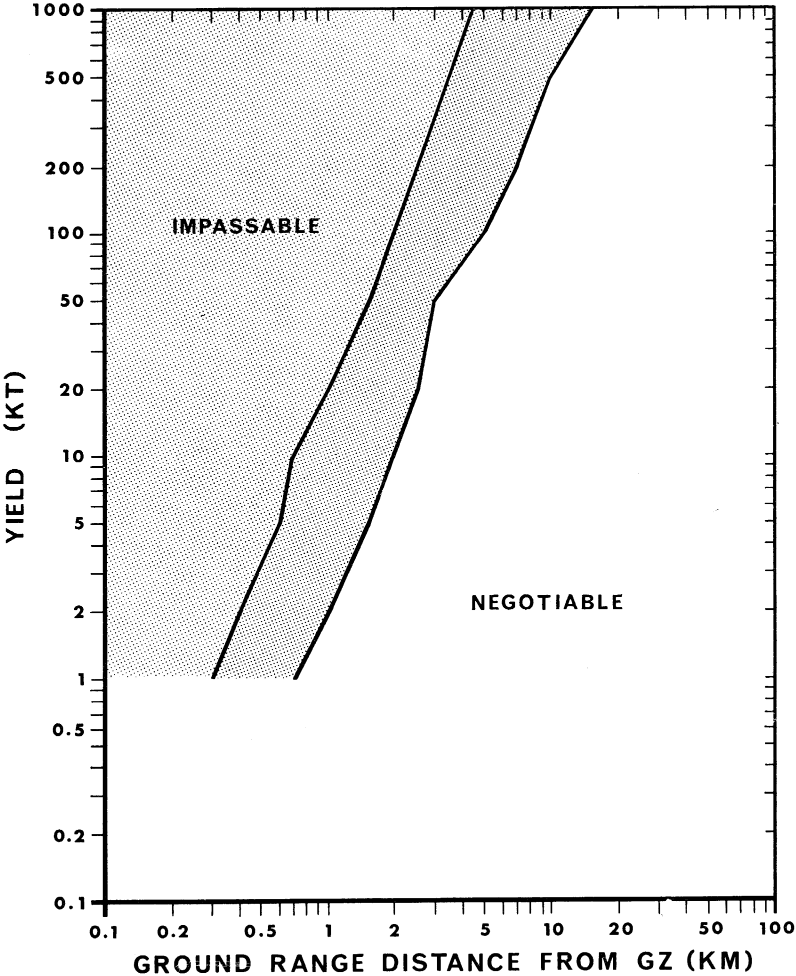
BRIDGES


1000
500
200
100
50
20
10
5
2
1
0·5
0·2
0·1
YIELD (KT)
IMPASSABLE
PASSABLE
0·1
0·2
0·5
1
2
5
10
20
50
100
GROUND RANGE DISTANCE FROM GZ (KM)

VEHICLE MOVEMENT THROUGH URBAN AREAS



MATERIAL: FOREST BLOWDOWN (WEST GERMANY) AFFECTING LIGHTLY ARMOURED TRACKED VEHICLES' MOBILITY



7. *Speed and coverage.* Survey teams must spend as short a time as possible in the contaminated area. Ideally the survey should be conducted using vehicles (preferably armoured) or as as airborne mission (*see* paragraph 8). However, readings should not be taken closer than three metres from a vehicle unless it has been specially fitted for this purpose. A vehicle will probably be contaminated with radioactive dust, and should therefore only be used to speed up the survey by carrying the party to each monitoring point. Radiological survey parties (ground or air) should not stop to take part in rescue or other work.

Aerial radiological survey

8. Aerial survey can only give a rough indication of the radiation intensities. It provides a quick method of indicating the general fallout pattern. The pilot can be instructed to land in a contaminated area to take a reading, after which a further reading should be taken at the aircraft's operating height above the same point on the ground. (It must be remembered that helicopters stir up dust for a considerable distance around their landing site. The pilot must therefore walk some distance before taking a reading.) An air to ground correlation factor (AGCF) is obtained by dividung the first reading by the second and this can be used to convert readings at the operating height to intensities at ground level. Alternatively it may be decided he should avoid contaminating himself or his aircraft and should not land in the area. In this case the theoretical AGCF given at Figure M1 should be used by the formation NBC staff. The pilot should fly at a set height above the ground. Operational reasons may cause him to fly tactically. Wherever practical, reports of intensities should be sent by radio in clear. Light aircraft and helicopters used for this purpose would be equipped with "Radiation Detection Set Airborne AN/ADR 501" (*see* Army Aviation Vol II Pamphlet No 5 (Army Code No 70455) (Part 2) Pam. 5)).

PROVISIONAL AIR GROUND CORRELATION FACTOR CURVE

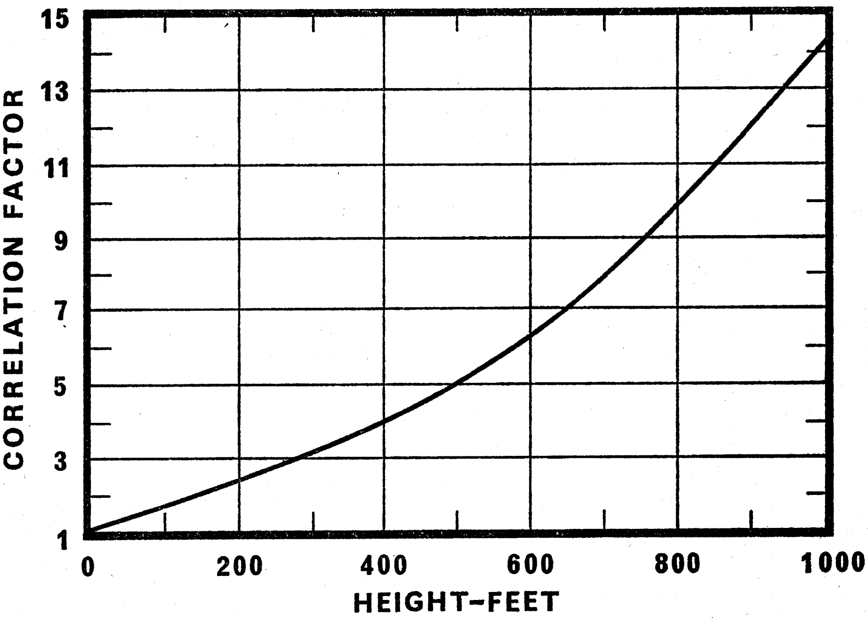


Fig M1—Air to ground correlation factor

A/26/GS *Trg Publications*/3153

MOD (Air) No. 3395 (Pam 8)

ARMY CODE NO.

70273 (Pam 8)

NUCLEAR, BIOLOGICAL AND CHEMICAL DEFENCE TRAINING

PAMPHLET No. 8
TRAINING AND TRAINING EQUIPMENT

This pamphlet supersedes "Gas Training 1951" Section 10 and Appendices B and C (WO Code No. 8511, AP 3221A); "The Gas Officers Handbook 1951 Sections 10 to 14 and Appendix A (WO Code No. 8630); "Nuclear Training All Arms" Volume 1 Pamphlet No. 1—"Precautions Against Nuclear Attack", Chapter 5 (WO Code No. 9466); "Nuclear Training" (All Arms) Volume 1, Pamphlet No. 2—"Radiac Instruments Lesson Plans" (Army Code No. 70007) Part 3 and Supplement No. 1.

By Command of the Defence Council

J T Durrett

MINISTRY OF DEFENCE,
November, 1971

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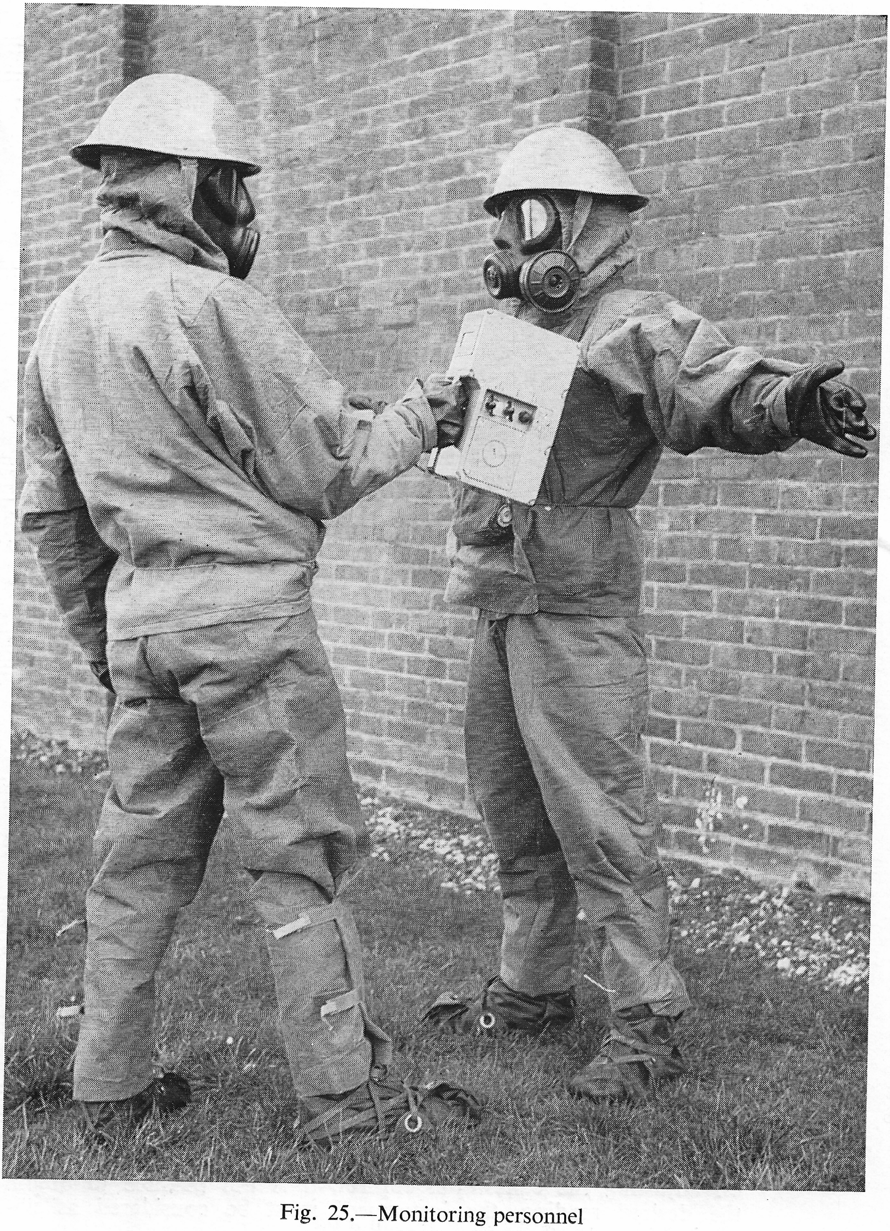

Fig. 25.—Monitoring personnel

Sealed radio-active training sources

277. The radio-active substance used for training sources is Cobalt 60 and four types of source are issued:

Serial No.	N.A.T.O. stock number	Type of source	Nominal activity	Ident colour on carrying rod	Transport index	NSN of container	Approx. weight of container and source
(*a*)	(*b*)	(*c*)	(*d*)	(*e*)	(*f*)	(*g*)	(*h*)
1.	6665–99–911–0016	B	00·1 millicuries	None	1·5 (10 sources) 0·75 (5 sources)	6665–99–911–0021	4 kilos (9 lbs.)
2.	6665–99–911–0017	C	1·0 millicuries	Blue	0·75	6665–99–911–0022	5 kilos (11 lbs.)
3.	6665–99–911–0018	D	5·0 millicuries	Brown	1·25	6665–99–911–0023	10 kilos (22 lbs.)
4.	6665–99–911–0019	E*	25·0 millicuries	Black	1·5	6665–99–911–0024	33 kilos (72 lbs.)

* Available on special request.

278. The transport index is defined as the maximum radiation dose-rate in mr/hr at one metre from the centre of the container. It is used in connection with the transportation of sources, (*see* para 331 c.).

Containers

279. Care must be taken to ensure that sources are stored and carried in their correct containers. Sources are always to be kept in their containers when not being used for training.

280. Each container has the type and serial number of the source it contains stencilled on the outside. Serial numbers and the type are also stamped on each source in RED and each source must be related to its correct container. A plate on the lid of the container gives the container and serial number. When Cobalt 60 sources are reactivated the date of reactivation will be found stencilled on the container and on a gummed label inside the lid. The metal plate on the lid gives the date of manufacture of new sources.

281. The current sign denoting radio-activity is the trefoil (*see* Fig 31) but many containers at present in service have other markings. All containers are normally coloured orange (BS 381 C No. 557) or yellow (BS 381 C No. 309).

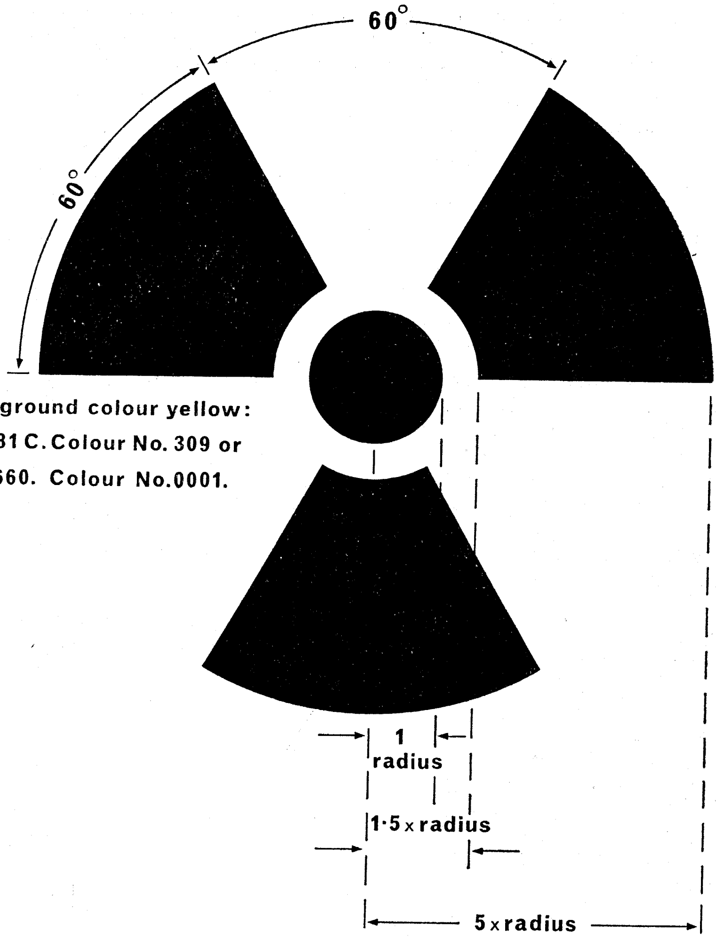

Fig. 31.—The trefoil sign

Training sources

282. *Type B* (*see* Fig 32). These are small button-like sources 0·1 millicurie in strength giving a dose-rate of approximately 0·13 mr/hr at a distance of about one metre. They are intended to simulate radio-active dust on clothing, equipment, etc. They are also used for calibration of the Meter Doserate Portable Trainer (*see* SECTION 31). INDIVIDUALS CAN HANDLE AND CARRY SINGLE Type B sources in training without significant risk but the source **should not be held or carried for longer than 20 minutes.** In store they are kept in a metal cylinder screwed to a carrying rod. The cylinder holds five or ten Type B sources. When all ten sources are together in one

cylinder they are equal to one Type C source and must NOT BE HANDLED without the aid of tongs. The following precautions are to be observed when removing Type B sources from the metal carrying cylinder:

- **a.** Pick up the carrying rod by the end farthest from the cylinder containing the sources.
- **b.** Hold the cylinder with a pair of long handled tongs.
- **c.** Unscrew the carrying rod.
- **d.** Tip out the sources on to a table.
- **e.** Pick up individual sources from the pile with a pair of forceps or tweezers.
- **f.** Once clear of the pile the source may be handled.

283. In returning the sources this procedure is reversed; the sources must be returned to the cylinder with a pair of forceps or tweezers and NOT with the bare fingers.

284. Because of their size "B" sources may be more easily lost than other sources. It is essential that after each training session the sources returned to each container are counted to ensure that there are none missing. A lost "B" source or one left in an individual's pocket could give rise to a serious health hazard.

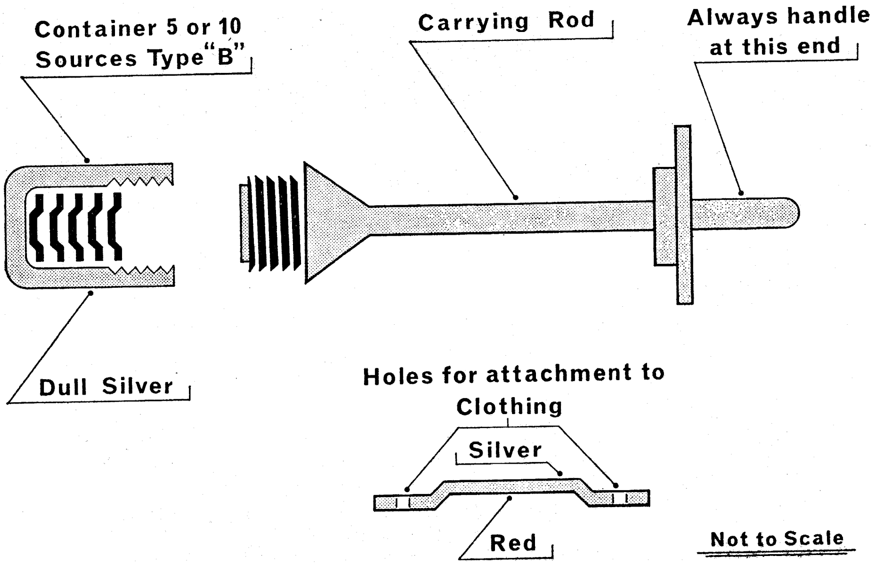

Fig. 32.—Radio-active source, Type B

285. *Type C* (*see* Fig. 33). These are one millicurie in strength and give a dose-rate of approximately 1·3 mr/hr at a distance of approximately one metre. The carrying rod is in one piece and has a plain end coloured BLUE. "C" sources are used for demonstrations, lectures and indoor and outdoor exercises.

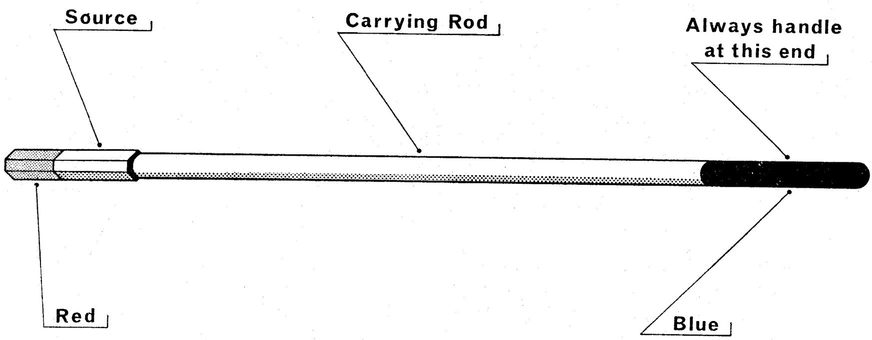

Fig. 33 —Radio-active source, Type C

286. *Type D* (*see* Fig. 34). These are five millicuries in strength and give a dose-rate of approximately 6·5 mr/hr at a distance of approximately one metre. The carrying rod is in two pieces which must be screwed together to ensure that, when carried, the source is at a safe distance from the hand. The end farthest from the source is fitted with a button-shaped head and coloured BROWN. The source is intended to be used for outdoor exercises and demonstrations.

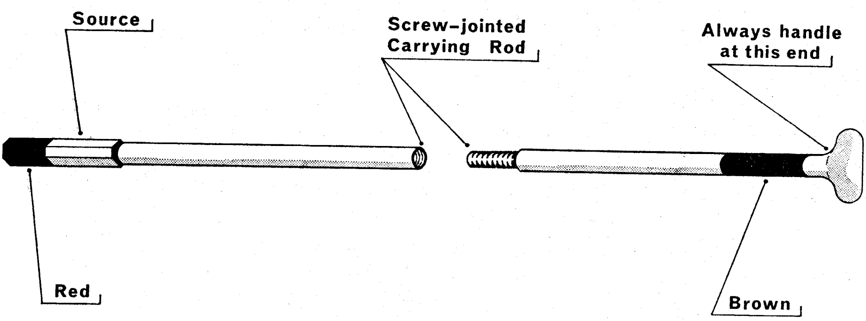

Fig. 34.—Radio-active source, Type D

287. *Type E* (*see* Fig. 35). These are 25 millicurie in strength and give a dose-rate of approximately 33 mr/hr at a distance of about one metre. The carrying rod is in two pieces which must be screwed together to ensure that the source is carried at a safe distance from the hand. The end farthest from the source is coloured BLACK. The source is for use in large scale

training exercises or for special trials purposes. Because of their strength "E" sources are not included in Radiac Training Sets and are available only on special authority which may be obtained through commands.

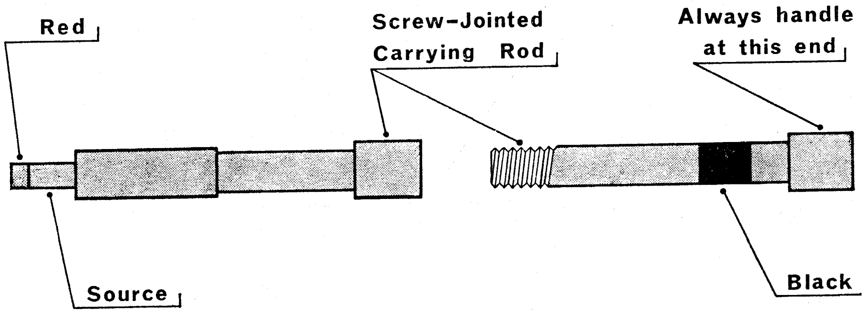

Fig. 35.—Radio-active source, Type E

288. All types of source may be used for calibration checks of the Meter Contamination No. 1 or No. 1 Mk 2 (*see* Nuclear Training (All Arms) Vol 1. Pamphlet No. 2 "Radiac Instruments Lesson Plans". Part 5 SECTION 4 (Army Code No. 70007) (Part 5). To be replaced by NBCDT Pamphlet No. 4. A series of exercises involving the use of these sources are described in SECTION 46.

Paras 289–297 *Reserved.*

SECTION 32—**Unit responsibilities**

The commanding officer

298. The commanding officer will take the following action when any of the radio-active sources listed in para. 277 are to be stored, used or transported under unit arrangements:

a. Ensure that the following instruments, which are part of the Radiac Training Set, are available:

(1) Dosimeter QF No. 1 or No. 1 Mk 2 or No. 7.

(2) Charging Unit No. 1 or No. 2 Mk 2 or No. 3.

(3) Meter Contamination No. 1 or No. 1 Mk 2.

(4) Meter, Dose-rate, Portable, Trainer, No. 1.

b. Ensure that the unit *Medical Officer* (MO) is informed in advance of the first acceptance of sources and of their intended use. The MO must also be informed of any changes in the use of sources already held. The MO is generally responsible for all medical matters concerning personnel working with radio-active sources. Special medical instructions are at Annex L.

RESTRICTED

HEADQUARTERS
UNITED KINGDOM LAND FORCES

OPERATIONAL & TACTICAL NOTES FOR HOME DEFENCE

G3/G4 UK 2241

RESTRICTED

UNITED KINGDOM LAND FORCES

OPERATIONAL AND TACTICAL NOTES

FOR

HOME DEFENCE

G3/G4 (UK) 2241 May 84

UNITED KINGDOM LAND FORCES

OPERATIONAL AND TACTICAL NOTES

FOR

HOME DEFENCE

FOREWORD

1. We now have a clear Concept of Operations for Home Defence and must concentrate on disseminating it to those who may have to carry out such operations.

2. This UKLF pamphlet is a RESTRICTED level document which provides the information needed by commanders at sub-unit level. It also provides information on how operations might develop within the United Kingdom in Transition to War, and War, for use as a basis for Home Defence training. It should be widely distributed and read by all Home Defence Commanders down to company/squadron level.

JBAkehurst

J B AKEHURST
Lieutenant General
Commander UK Field Army

18 May 84

G3/G4 (UK) 2241

UKLF

OPERATIONAL AND TACTICAL NOTES

FOR

HOME DEFENCE

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SECTION 1 - BACKGROUND

0101. These Notes are written to provide information for commanders at all levels on how operations might develop in the United Kingdom during Transition to War (TTW) and General War and also provide a framework on which to plan training. The Notes are based on the UKCICC Home Defence Plan (1) and HQ UKLF's Operational Instruction 1/83 (2) which are issued to District HQs.

0102. The Notes emphasize the New Concept of Operations and the joint-service nature of Home Defence as laid down in Project HEREWARD (3), the primacy of the Civil Police in Home Defence and the legal constraints under which the Armed Forces must operate in the United Kingdom in TTW and war. The joint military/civil nature of Home Defence is underlined by the definition of Home Defence at para 9201.

0103. It is planned that the information contained in these Notes will provide all units involved in Home Defence with the basic material for constructive operational training. It should therefore particularly help those Home Defence units which have limited training time, such as TA units and those made up from reservists, by providing an easy reference pamphlet. Inevitably this pamphlet duplicates material in some existing documents. It should therefore be read as a supplement to the Army Field Manual where relevant. Although Home Defence must not stand apart from normal tactical doctrine, it is important to understand the variations and constraints that arise on ground operations within the United Kingdom in TTW.

0104. It is not the intention of this Pamphlet to replace the imagination and forethought needed for succcessful training or to replace District instructions or SOPs. It outlines the principles of Home Defence and gives sufficient information within a RESTRICTED security classification to assist commanders to plan realistic and progressive training.

(1) UKCICC 1252 dated 21 May 84 (Final Draft).

(2) HQ UKLF G3/G4 (UK) 1216 dated 29 Oct 82.

(3) UKCICC(H) 1256/6 (Final) dated 2 November 1981.

SECTION 20 - INTRODUCTION

2001. The threat to the UK base is both real and massive, and exists in peacetime as in war.

2002. Broadly speaking, the threat can be grouped into two categories, external and internal, which themselves comprise several elements. These elements are dealt with in the following sections:

a. Section 21 - External Threat: Sabotage.

b. Section 22 - External Threat: Air and Missile Attack.

c. Section 23 - External Threat: Maritime.

d. Section 24 - External Threat: Electronic Warfare.

e. Section 25 - Internal Threat: Espionage.

f. Section 26 - Internal Threat: Subversion.

g. Section 27 - Internal Threat: Sabotage.

2003. Any assessment of the threat must take into account enemy capabilities and weaknesses, his intentions and his efforts to obtain information on our own plans.

2004. The major threat to NATO, and therefore to the UK, comes from the Warsaw Pact (WP) countries. These are the Soviet Union, Poland, East Germany, Czechoslovakia, Hungary, Bulgaria and Rumania. Yugoslavia and Albania are part of the Eastern Bloc but not members of the WP, and although sympathetic to the Socialist cause, take an independent line from Moscow. The UK provides a major base for NATO air and maritime operations, and for the movement of reinforcements and supplies to mainland Europe. As such it is an important target for the WP, to be neutralised or destroyed at the earliest opportunity.

2005. In peacetime, reconnaissance and planning for sabotage and raids are constantly being conducted, as are, as a matter of routine, espionage, subversion and radio intercept.

2006. During TTW the WP will attempt to disrupt our preparations by means of subversive activity, including propaganda, organised sabotage of key installations using both specialist troops and indigenous extremist elements sympathetic to the cause, and increased levels of EW activity.

2007. In war itself, a full-scale amphibious and/or airborne invasion of the UK is assessed as unlikely, in the initial stages at least. However, we can expect air and missile attacks using conventional, chemical, and ultimately nuclear, weapons, sabotage of vital military installations and intensive EW against our communications.

SECTION 21 - EXTERNAL THREAT: SABOTAGE

THE NATURE OF SABOTAGE

2101. Sabotage is defined as: "an act other than a conventional military attack intended to damage, destroy or disable the functioning of civil or military plant, buildings or equipment in order to assist a foreign power or further a political aim". It is often difficult to differentiate between sabotage and malicious damage which is usually done for individual gain or personal revenge, or terrorism which, as will be explained in Section 26, is essentially violent subversion. Key figures in the nuclear firing chain of command and those responsible for other political and military decisions could be targets for assassination.

2102. The threat of organised sabotage in peacetime is low, but will increase greatly during TTW and in the early days of war. The Soviet Union has specialist troops called Special Purpose Forces (SPF) or "Spetsnaz" (from their Russian designation) trained in sabotage techniques. Most will be deployed against targets in Europe and Scandinavia, but some can be expected to be earmarked for operations against UK targets.

TARGETS

2103. Targets for SPF attack will be those crucial to the maintenance of our war effort, and will include:

a. British and US nuclear strike capability and associated command and control facilities.

b. Ballistic Missile Early Warning System (BMEWS) and other early warning/air defence systems.

c. LofC installations, eg ports, reinforcement airfields, etc.

In some instances, the task of the SPF group may not be sabotage: instead they may conduct reconnaissance and target verification/marking for an air strike.

TECHNIQUES

2104. Soviet sabotage operations are likely to be well planned and based on careful study of the targets. The attacks would be carried out in a determined and skilful manner and may involve covert or overt entry into a poorly defended establishment, direct assault or the use of stand-off weapons outside the target perimeter. Sophisticated man-portable weapons would be available to them including incapacitating agents. On occasions, rather than destroy a target, the aim may be to inflict sufficient damage to put it out of action; this could include killing or incapacitating personnel.

TIMINGS

2105. SPF troops are likely to be infiltrated either during a period of tension or after the commencement of conventional hostilities. Operations mounted during a period of tension would require tight control of SPF teams so as to prevent compromising and/or endangering last minute negotiations.

SECTION 22 - EXTERNAL THREAT: AIR AND MISSILE ATTACK

GENERAL

2201. In general, land targets in the UK are expected to be attacked by bombers of the Long Range Aviation (LRA). Aircraft of the Tactical Air Force (TAF) may also be used, but this would depend on the circumstances at the time. The Soviet Naval Air Force (SNAF), if used, would attack maritime targets. Reconnaissance and specialist EW missions can also be expected.

CONVENTIONAL

2202. Until the mid-1980s, the main threat will be posed by the already ageing BEAR, BISON, BADGER and BLINDER bombers, all of which are capable of carrying free-fall bombs and air-to-surface missiles.

2203. These bombers are gradually being replaced by the BACKFIRE bomber, a sophisticated, all weather aircraft with sufficient range to cover the whole of the UK from their home bases. It can carry up to eight tons of bombs, and is capable of stand-off attack using KINGFISH or KITCHEN missiles.

2204. FENCER light bombers of the TAF could be used in certain circumstances. It can cover targets in SE England from its bases in Western USSR, in a lo-lo-lo profile.

NUCLEAR AND CHEMICAL

2205. All bombers can carry both conventional and nuclear weapons, and in the initial stages would probably carry conventional weapons. Once nuclear release has been authorised, the main threat would come from land and submarine-launched missiles. It is believed that the bombers would be used as a follow-up force, and would arrive soon after nuclear strike. New tactical weapons are coming into service in East Germany which could cover SE England and the Home Counties. However, it is assessed that the use of these weapons against the UK base is unlikely.

2206. Chemical weapons are regarded by the Soviet Union as part of their conventional armoury. However, we do not expect that they will be used to any great extent until around the same time as nuclear release authority is given by Moscow.

TARGETS

2207. Targets for LRA aircraft are broadly the same as those for sabotage teams (see Section 21). They would include our nuclear response capability, radar and early warning sites, airfields, NATO reinforcement and re-supply facilities, and command and control installations. Highest priority would be given to nuclear-associated targets.

SECTION 23 - EXTERNAL THREAT: MARITIME

2301. The maritime threat to the UK base would consist primarily of the mining of coastal waters and harbour entrances, particularly those associated with our reinforcement capability.

2302. Soviet intelligence gathering trawlers (AGIs) are ever-present near UK coastal waters, monitoring military activities and shadowing RN exercises. There is no doubt that their activities will be intensified during a period of tension.

2303. Submarines, particularly SSBNs, are constantly on patrol in the Atlantic. As more nuclear-powered submarines are built, conventionally powered vessels may be released to carry out interception/interdiction tasks in UK waters.

2304. During a period of rising tension, those ships belonging to a potential enemy that remain in UK ports might be used as bases for acts of sabotage.

SECTION 24 - EXTERNAL THREAT: ELECTRONIC WARFARE

2401. The Soviets conduct extensive EW, particularly the exploitation of our electronic systems by intercept and direction finding (DF). The results of this activity, when used in conjunction with physical reconnaissance, can provide valuable targetting information for physical attack and/or jamming.

2402. The Soviet Union has a massive capability. Intercept is carried out in peacetime as much as in war, with specialist intelligence gathering ships on station off our coast, aircraft, satellites and ground stations, which constantly monitor all western diplomatic and military communications and electronic emissions.

2403. Another major element of EW is jamming. UK early warning and air defence communication systems are at particular risk, immediately prior to and during air attack, from jamming by aircraft specially equipped for the task, and by the attacking aircraft themselves.

2404. Because the threat from EW is intangible, it is difficult to appreciate its full extent. It is also extremely difficult to counter. Nevertheless, simple solutions, such as keeping radio transmissions as short as possible, can be found and must be practised.

SECTION 25 - INTERNAL THREAT: ESPIONAGE

THE NATURE OF ESPIONAGE

2501. The threat to the UK from espionage comes mainly from the Intelligence Services of the Soviet Union, together with those of Eastern Europe and Cuba which are to a significant extent controlled and coordinated by the Soviet Intelligence Services. The threat, significant even in peacetime, could be expected to increase in a period of TTW.

2502. The UK has been a priority target for the Russian Intelligence Services since the 1920s. The Soviet Union and its allies devote considerable resources to collecting political, economic and technical intelligence and particularly information on UK military deployment and defence capabilities. The Intelligence Services of other communist countries such as China and Yugoslavia also present a threat to the security of the UK but it is less than that offered by the Warsaw Pact countries.

2503. In peacetime, Hostile Intelligence Service (HIS) use both overt and clandestine means to obtain intelligence. Published information, official contacts and de visu intelligence gathering go some way to meeting HIS requirements. Clandestine methods, particularly the use of agents, are necessary when the information is classified or otherwise protected. Agents may be motivated by ideology, greed or, as a result of blackmail or other pressure, they are recruited because of their access or potential access to areas of HIS interest. In time of tension preceding war, overt intelligence gathering will become progressively more difficult and HIS will place increased reliance on their agents.

ESPIONAGE TARGETS

2504. HIS activity in the defence field is likely to concentrate on the following targets:

a. Nuclear installations and capabilities.

b. Command and control facilities.

c. Air defences.

d. Composition and capabilities of units, plans for movement of reinforcements and the installations associated with mobilization and reinforcement.

SECTION 26 - INTERNAL THREAT: SUBVERSION

THE NATURE OF SUBVERSION

2601. Subversion is defined as activities threatening the safety or well-being of the state and intended to undermine or overthrow Parliamentary democracy by political, industrial or violent means. Both legal and illegal means may be used to further subversive aims.

SUBVERSIVE ORGANISATIONS

2602. Although the agencies (including the Intelligence Services) of Communist governments on occasion pursue subversive objectives in the UK, the major subversive threat arises from the activities of indigenous subversive organisations. The most important subversive organisations are:

a. Communist

b. Trotskyist

c. Extreme Right

The membership of all these organisations amounts to not more than 50,000.

SUBVERSIVE ACTIVITIES AND METHODS

2603. Subversive organisations are active in a number of areas of public life. By far the most important sphere of activity in recent years has been the trade union movement in which the influence of the Communist Party of Great Britian (CPGB) is much greater than the number of Communist members of trade unions would indicate. The CPGB had achieved this position by encouraging its members, over many years, to seek local, regional and national office in their unions. Trotskyist groups have been much less successful than the CPGB, but they often involve themselves in industrial disputes (sometimes leading to violent picketing).

2604. Other areas of interest to subversive organisations are the armed forces and civil service; the peace and disarmament movements; and the media. In all these spheres the organisations have enjoyed very limited success.

2605. Apart from the terrorist campaigns of the Republican and Protestant paramilitary organisations based in Northern Ireland, few subversive organisations in the UK pursue a strategy of violence. The exceptions are very small extreme nationalist groups in Wales and Scotland.

2606. As far as Hostile Intelligence Services are concerned, use has been made of the special information manipulation technique of "disinformation" which involves the planting of rumours and false reports.

SECTION 27 - INTERNAL THREAT: SABOTAGE

2701. Although there is virtually no threat of WP organised sabotage in peacetime, indigenous extremist groups and individuals hostile to the government may carry out actions for their own ends probably using relatively unsophisticated methods possibly including "home made" devices.

SECTION 28 - CONCLUSIONS AND COUNTER MEASURES

INTRODUCTION

2801. As will have been appreciated from the preceding sections, the threat posed to the UK by the WP is many faceted. It ranges from the current threat, which is mainly one of subversion and espionage (including electronic espionage), changing to one of increased subversion and espionage coupled with sabotage during a period of TTW and finally to one of conventional air attack, NBC air and missile attack and even eventually amphibious or airborne raids, all supported by extensive EW.

2802. In preparing to meet this threat our own intelligence and security measures both now and particularly during a period of TTW must be effective.

THE INTERNAL THREAT IN PEACETIME

2803. Education. Because enemy preparations for operations in the UK are being made now, defensive measures against the current threat must form part of our daily routine. An essential element of intelligence training is therefore the education of all ranks on the nature of these threats and appropriate counter measures. Advice on this aspect of training is provided by the Int & Sy Gp (UKLF) through the sections of 9 Sy Coy which are deployed to all Districts. Additionally, the Security Mobile Instructional Team (SMIT) of the Int & Sy Gp (UKLF) tours the UK throughout the year to provide lectures and short courses. Details of their programme are available from District HQ Int/Sy staffs.

2804. Security Measures. The following procedures should be constantly reviewed.

a. Control of access to camps and restricted areas. Guards, patrols, pass system and fences. Searches of vehicles and personnel.

b. System for reporting suspicious incidents.

c. Measures in force for the protection and issue of arms, ammunition and explosives.

d. Arrangements for guarding vehicles and fuels.

e. Routine protection of classified information.

f. Measures in force for limiting unnecessary radar transmission.

INTELLIGENCE OPERATIONS DURING TTW AND IN GENERAL WAR

2805. Introduction. Intelligence in HD includes both intelligence relating to the external military threat to the UK and security intelligence, which embraces the internal threats of espionage, sabotage and subversion including terrorism. It also covers those elements of intelligence related to civil defence tasks.

2806. Liaison. The Army in the UK relies largely on the Police to provide its intelligence on the internal threat to the UK in peacetime and would be similarly reliant during TTW even when troops were deployed in MACA or were themselves involved on operations. For various reasons it is only rarely possible to carry out exercises jointly with the Police. Nevertheless the Police may be invited to attend Army study periods on HD.

2807. Intelligence Responsibilities. Although the Police will be primarily responsible for processing information and making local assessments the Army can expect to receive a substantial amount of information arising from incidents, such as sabotage or attempts to gain unauthorised access, which will need to be passed upwards, downwards and sideways through the military chain of command. This will include passing information to all Services within TAORs using the Focal Point System. Follow up investigations by military security personnel are also likely to result in the production of more information and intelligence.

2808. Intelligence Tasks. Operations room personnel, particularly in those units without intelligence cells, will be inundated with information, the receipt and onward transmission of which will require high standards of log keeping, map marking and reporting. Aspects of intelligence in HD of direct interest to the Army are grouped under the headings intelligence awareness and acquisition tasks. The Army Intelligence Organisation for HD is described in Section 29.

2809. Intelligence Awareness. The need for education and vigilance was mentioned at paragraphs 2803 and 2804. During TTW, not only will peacetime security measures need to be strengthened but military personnel should also be more alert to enemy preparations for operations. In addition some knowledge of likely enemy tactics will be required. Some examples are:

a. Indications of Preparation for Sabotage Operations:

(1) Extensive espionage activity at potential targets.

(2) A programme of subversive activity directed at personnel working in potential targets.

(3) Thefts of explosive or incendiary material.

(4) Evidence of sabotage or guerrilla training being conducted by Hostile Intelligence Services (HIS).

b. Attack Techniques - Sabotage. The professional saboteur can be expected to:

(1) Strike when least expected.

(2) Take advantage of anything that makes life difficult for guards.

(3) Make his attack difficult to recognise as being sabotage.

(4) Use diversion tactics to confuse guards.

(5) Prevent replacement or repair by attacking identical targets simultaneously.

2810. Intelligence Acquisition Tasks. During the later stages of TTW and more particularly after a nuclear attack, military personnel are likely to be required for a variety of intelligence gathering tasks. For example:

a. Locating and identifying remaining enemy raiding parties.

b. Acquisition of topographical information.

c. Locating and reporting the state of:

(1) Water supplies.

(2) Food, including livestock.

(3) Medical facilities.

(4) Housing.

(5) Transport.

(6) Refugees.

(7) Communications.

(8) Plant.

(9) Radiation hazard.

(10) Chemical hazard.

c. Under Common Law the Armed Forces are required to respond to requests for assistance from the Police. The Armed Forces have no more powers than they do in peacetime until Emergency Powers are passed in TTW. See Section 35. The legal powers of soldiers in peacetime are set out in the Manual of Military Law Part II, Section V and in Land Operations Vol III Chapter 2. Reference may also be made to MMLI, Chapter VI, para 13 which deals with Powers of Arrest which the Armed Forces have in common with private citizens. The most important aspects are:

(1) Breach of the Peace. Under Common Law any private individual, including a member of the Armed Forces, may arrest without warrant any person committing or attempting to commit a breach of the peace if the offender's conduct amounts to an assault, occasions public alarm and excitement or obstructs a public officer in the execution of his duty.

(2) Criminal Law Act (CLA) 1967, Section 2. Under this provision, any person may arrest without warrant anyone who is, or who is with reasonable cause suspected of being in the act of committing an 'arrestable offence'. Very broadly, an 'arrestable offence' is one involving a risk of five years imprisonment for the arrestee. Further, if an arrestable offence has in fact been committed, anyone who is, or who is with reasonable cause suspected of being, guilty of the offence may be arrested without warrant.

(3) The Official Secrets Act (OSA) 1911, Section 6. This section provides ordinary citizens (including members of the Armed Forces) with a power of arrest of those, broadly, found or suspected of 'spying', trespassing or committing other offences in regard to 'prohibited places'. 'Prohibited places' are defined in OSA 1911 s.3 as including any defence works, military installations, ships or aircraft. Additionally, means of communication, public utility works, factories, etc may be declared by Secretary of State's order to be prohibited places.

(4) Military Lands Act 1892. Under this Act, a Secretary of State has power to make bye-laws as to the use of certain land held for military purposes and for securing the safety of the public.

3106. Military Liaison Officers. Because the Civil Police have primacy in Home Defence matters and will be the most important source of intelligence in TTW and War, it is essential that the Armed Forces retain close liaison with the Police at all levels. To help with this process a Military Liaison Officer (MLO) will deploy to every county Police Force Headquarters early in TTW.

ARMY TASKS

3107. Warning and Conventional Period (See Section 36). Army tasks during this period will be:

a. Guarding Army KPs and some RN and Civil KPs.

b. MACA (See Section 43).

3113. When operations have to be mounted quickly, or where a civilian population is deeply involved, or there is a real danger of escalation into nuclear war, governments will insist on exercising strict control of even the smallest operation; and modern communications, of course, make this increasingly practicable. A British military commander, even at the lowest level, must understand quite clearly that most of his activities, whether they be tactical or administrative and whether he is engaged in internal security, counter insurgency, limited or general war, are likely to be influenced in some degree by political direction. He must come to terms with this state of affairs and not allow himself to be upset by the delays and uncertainties inherent in a political context.

SECTION 66 - ELECTROMAGNETIC PULSE (EMP)

6601. EMP is a burst of energy, released in the form of a pulse of electromagnetic radiation in all nuclear explosions, air bursts being the most damaging. It induces very high voltages and currents in cables, telephone lines, antennae and similar conductors, which in turn damage individual components in the associated equipments. Transistors are particularly vulnerable.

6602. Protective measures which should be taken:

a. The disconnection of antennae, co-axial cables, remote control cables, power leads and line cables to equipment not in use.

b. Switch off the equipment.

c. Earth input and output terminals.

d. Connect metal casings to earth.

e. Wrap equipment in metal foil if possible.

6603. Some vital equipments will be required to remain switched on. These terminal equipments will normally incorporate "EMP hardening" in their design. This provides limited protection from this aspect of nuclear explosions. EMP hardened equipments include CLANSMAN and MOULD radios. It must be presumed that all other equipment in use in HD communication (exchanges, teleprinters etc) are not EMP protected.

SECTION 86 - PUBLIC INFORMATION

8601. It is important to recognise the particular importance of the media to the successful conduct of operations in the United Kingdom.

8602. Public opinion is extremely volatile and increasingly responsive to the influence of the news media, particularly television. It is generally accepted that military operations - particularly in the home base - cannot be successful without majority public support. Therefore it follows that commanders at all levels should be aware of their responsibilities in the field of media relations.

8603. They should appreciate that even trivial incidents involving the press or television can escalate at an astonishing rate into issues of national concern attracting wide public interest and Ministerial and Parliamentary scrutiny. A study of the Army and the Press in Northern Ireland will indicate the complexities and ramifications involved when the Army acts in full view of the home-based media. Television techniques of increasing sophistication will focus public attention more forcefully and rapidly on all events of "news value". In operations at home it may no longer be enough for the Army to do its duty - it will have to be <u>seen</u> to be doing its duty. Otherwise the consequences as regards public opinion and through it possibly even the outcome of any operation may be extremely serious.

8604. Therefore it is important that commanders should develop a good appreciation of the likely effect of their actions on the media and hence the public. They should be aware of the necessity for accurate and timely reporting through correct PR channels of any incident which may attract media interest. They should also be aware of the subtleties of handling any media representatives with whom they come into contact, and that even a very junior journalist from a small newspaper has the capacity to feed a story into Fleet Street and bring about the full glare of national publicity. It all depends on the incident and its interpretation. It is always a good plan to have a relatively senior officer earmarked for press liaison duties and again a study of the unit press officer system and in particular its application in Northern Ireland will be profitable.

8605. Many eminent authorities have stressed that wars can only be won if the public broadly support them. The key to public opinion is the media. The importance of the media and the Army's relationship with it in any future conflict - particularly in the home base - cannot be over emphasised.

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THE LAND BATTLE

PART 1

TACTICS, NUCLEAR OPERATIONS IN EUROPE

(*Prepared under the direction of the Director of Army Training*)

This pamphlet supersedes The Land Battle Part 1—Tactics, 1960 (Code No. 9637), The Corps Tactical Battle in Nuclear War, 1958 (Code No. 9564) and Sequel No. 1, 1959 thereto.

By Command of the Defence Council.

Henry Hardman

MINISTRY OF DEFENCE,

3rd September 1964

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AMENDMENTS

Amendment number	By whom amended	Date of insertion

DISTRIBUTION

(*See Catalogue of Army Publications, Part II*)

Regular Army (other than those mentioned below and Women's Corps) .. .. Scale D

RAChD, RAPC, RAVC, RAEC, and RADC .. .. Scale A

Territorial Army .. .. As for Regular Army

Amdt. 2/Nov/1966

(To be inserted inside of front Cover (Binder) preceding PART 1)

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ARMY
CODE NO.

9637

THE LAND BATTLE (ALL PARTS)

FOREWORD

1. A series of pamphlets is being written to cover all aspects of operations by the Army under the general heading of "THE LAND BATTLE". The purpose of the series is twofold. Firstly, it is to define tactical doctrine which can be used by all commanders to train their formations and units to meet their present tasks and to prepare for their possible ones in the future. Secondly, it promulgates a common doctrine to be used by training establishments as a basis for their instruction.

2. The series is to be studied by all officers.

3. The following parts have been completed:—

Part 1 Tactics, Nuclear Operations in Europe (Revised 1964 and issued under new title).
Part 2 Command and Control.
Part 3 Tactics, Non-Nuclear Operations.
Part 4 Defence against Chemical and Biological Warfare.

4. The four parts supersede the following pamphlets which should be destroyed:—

(*a*) Anti-Tank Tactics, 1953 (Code No. 8807).
(*b*) Command and Organization of a Corps Headquarters in War, 1950 (Code No. 8618).
(*c*) The Infantry Division in Battle, 1950 (Code No. 8476).
(*d*) The Armoured Division in Battle, 1952 (Code No. 8715).
(*e*) The Corps Tactical Battle in Nuclear War, 1958 (Code No. 9564) and Sequel No. 1 (Code No. 9564 (A)).
(*f*) The Land Battle Part 1—Tactics 1960 (Code No. 9637).

Amdt. 2/Nov/1966

5. Doctrine and tactics for internal security operations are covered in " Keeping the Peace " Parts 1 and 2 (Army Code Nos. 9800 and 9801). The background to suppressing insurgency is dealt with in " Quelling Insurgency " Supplement No. 2 to JSP 1 (First Revise). The mounting and execution of joint service operations are the subjects of " The Manual of Joint Warfare " (JSP1–6).

6. For additional study the following pamphlets should be read:—

(*a*) Training for War (Army Code No. 9626).

(*b*) Staff Duties in the Field (Army Code No. 8457) (Revised 1962).

(*c*) Armour (Army Code No. 70032).

(*d*) Infantry Training Volume IV Tactics—The Infantry Battalion in Battle, 1963 (Army Code No. 9923).

(*e*) Nuclear Handbook for Instructors and Staff Officers, 1957 (Army Code No. 9405).

(*f*) Nuclear Training, All Arms, Volume I, Pamphlet No. 1—Precautions against Nuclear Attack (Army Code No. 9466).

(*g*) Artillery Training Volume VIII—Artillery in Nuclear Warfare, Pamphlet No. 1—Nuclear Fire Planning, 1960 (Army Code No. 70010).

(*h*) Concealment in the Field, 1957 (Army Code No. 9459).

(*j*) Administration in the Field (Army Code No. 70182) (in production, supersedes Code Nos. 9546 and 9622).

The principles of war

7. The principles of war are unchanged and are still applicable to all operations.

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CHAPTER V

THE NUCLEAR BATTLE

SECTION 11—THE HANDLING OF GROUND FORCES

Tactics in the attack

157. In the attack the commander must :—

(a) locate and destroy or neutralize as many of the enemy's nuclear delivery systems as possible ;

(b) maintain the speed and momentum of his attack ;

(c) destroy those enemy forces that block the direction of his advance ;

(d) avoid the presentation of nuclear targets to the enemy.

(evacuate targets or protect them)

158. Suitable forces for these tasks will be highly mobile both by day and by night, capable of fast movement across going of all types, and with the highest possible protection against nuclear attack while on the move. There is likely to be a preponderance of tanks, APCs and armoured reconnaissance vehicles in any attacking force operating under nuclear conditions. These forces are likely to be used in conjunction with airborne formations.

159. The tactical handling of armoured forces of this kind in the attack will aim :—

(a) to exploit the effects of nuclear strikes ;

(b) to overwhelm the enemy defences with the weight and speed of the attack ;

(c) to maintain a constant pressure on a withdrawing enemy so that his nuclear fire power cannot be brought to bear on the attacker without danger to the withdrawing forces ;

(d) to by-pass enemy units where necessary in order to maintain the speed of the advance.

160. High priority targets for the attacker's nuclear weapons are likely to be :—

(a) enemy nuclear delivery systems ;

(b) engineer units, particularly those employed on the preparation of obstacles ;

(c) formation HQ and communication systems ;

(d) reserve formations, particularly armoured units.

161. In addition to nuclear weapons, there is no reason to doubt that an attacker will resort to chemical warfare to achieve his aims.

162. The greatest difficulties that are likely to face an attacker are :—

(*a*) to concentrate armoured forces in order to exploit nuclear strikes, without presenting a suitable target to enemy nuclear weapons ; (=> NEUTRON BOMB W79)

(*b*) to neutralize enemy means of surveillance ;

(*c*) to acquire targets for nuclear strikes ;

(*d*) to re-supply his forces.

Conduct of the defence

163. In defence, against a numerically superior enemy, the commander must :—

(*a*) disrupt enemy attacking formations before they make contact with the main defensive forces ;

(*b*) control ground of his own choosing :—

(i) to make the attacker present nuclear targets ;

(ii) to preserve the necessary means of combat surveillance and nuclear weapon delivery ;

(*c*) deliver nuclear weapons quickly and accurately.

164. The execution of these tasks requires a defensive system which will form the basis of the defender's tactical plan. Each part of this is studied in greater detail in subsequent sections of this chapter. The defensive system will take account of the following factors :—

(*a*) The destructive power of the nuclear weapon coupled with modern methods of combat surveillance invalidates a fixed defensive line. (UNLESS NEUTRON BOMBS STOP/DETER CROSSING OF THE LINE!!)

(*b*) The system of defence must :—

(i) force the enemy to reduce the speed of his advance ;

(ii) canalize the direction of his advance ;

(iii) induce his follow-up forces to concertina against the leading troops.

(The obstacle zone, which provides a system of this sort, is discussed in greater detail in Section 13.)

(*c*) The deployment of covering forces will be necessary to ensure the disruption of the attacking forces and to win time. The tactics suitable to covering forces are discussed in Section 14.

(*d*) Until contact is made with the enemy forces, information must be obtained of the speed, direction and strength of the enemy's leading elements. This requires a screen ; the composition and tasks of screen forces are discussed in Section 15.

(*e*) The part played by air forces in the nuclear battle which is discussed in Section 16. It does not differ greatly from non-nuclear operations.

(*f*) Air defence, which is covered in Section 17.

SECTION 21—PROTECTION OF MEN AND EQUIPMENT AGAINST NUCLEAR ATTACK

Policy

296. In nuclear war, men and equipment must be protected from the primary and secondary effects of nuclear attacks but protective requirements must take second place to operational effectiveness whenever the two conflict.

Protective measures

SEE P. 57 (APPENDIX A) FOR TABLES!

297. The effects of nuclear weapons have been summarized in Chapter I. They, and the protective measures against them, are described in detail in "The Nuclear Handbook for Instructors and Staff Officers, 1963" (Code No. 9405) and "Nuclear Training All Arms, Volume I, Pamphlet No. 1—Precautions against Nuclear Attack" (Code No. 9466).

298. Nuclear defensive measures must be laid down in SOPs of all formations and units and any special measures necessary for a particular operation must be included in the operation instructions concerned.

Exposure control

299. After operating in areas contaminated by radio-active fall-out, units should check the degree of contamination to which they have been subjected. It is a command responsibility to decide the future employment and location of contaminated troops and the highest radiation dose level to which they can be further exposed without risk of severe casualties. Decontamination drills will be carried out at the earliest opportunity.

Battle shelters

300. The priorities in the construction of battle shelters are as follows :—

(*a*) Work should be carried out under a screen affording some camouflage and thermal protection.

(*b*) Trenches should be narrow and deep with vertical sides. 4 feet 6 inches is the optimum depth.

(*c*) The temporary thermal shield should be replaced by proper overhead protection.

(*d*) Shelters should be enlarged progressively to allow men to carry out the functions of life and operational tasks effectively.

301. Digging must be a standard drill and not an emergency measure. A properly constructed trench will provide excellent protection.

302-306. *Reserved.*

SECTION 22—TROOP WARNING

Responsibility

307. It is a general staff responsibility to ensure that all practicable steps are taken to warn any of our own troops who may be affected by :—

(a) our own nuclear strikes ;

(b) enemy NBC attacks.

Own nuclear strikes

308. In principle, the formation requesting the strike is responsible for initiating all necessary troop warning.

309. Warning is given by means of a nuclear strike warning message which is sent encrypted or encoded unless the time on target (TOT) is so close as to allow the message to be sent in clear. Details of the form of message are given in " Staff Duties in the Field " (Code No. 8457) (Revised 1962), Chapter 7.

310. All unit and formation HQ receiving the warning message will ensure that any troops who may be within the radii of the principal effects of the strike are warned. In addition, those ground and air forces which may be up to 8 kilometres by day and 24 kilometres by night from DGZ must be given a dazzle warning.

311. Little difficulty is expected in passing the necessary warning to unit level, but warning within units and the warning of individuals temporarily out of touch with their units will present a considerable problem. This will apply particularly to administrative parties, drivers of isolated vehicles and recovery teams. Infantry patrols and engineer working parties may be similarly affected. Efforts must be made to reach every man affected but the tactical plan cannot be jeopardized for the sake of complete warning. Nevertheless, warning will be an important factor which must be taken into consideration in the commander's appreciation when planning a nuclear strike.

312. Visual display notice boards will be erected at all traffic control posts, information centres and HQ.

Enemy NBC attacks

313. NBC Centres evaluate, record and disseminate details of all enemy NBC attacks. Warning of the effects will include radiation hazards from fall-out and other residual effects from nuclear strikes and locations of contaminated areas from attacks by biological and chemical agents. (See " Staff Duties in the Field " (Code No. 8457) (Revised 1962), Chapter 7.)

Sign posting of contaminated areas

314. Units and formations will be responsible for sign posting contaminated areas within their own occupied areas. Provost carry out any sign posting in areas evacuated or unoccupied by units, particularly on main supply routes. Details of marking are given in "Staff Duties in the Field" (Code No. 8457), Chapter 3, Section 9.

315-319. *Reserved.*

SECTION 23—CHEMICAL AND BIOLOGICAL WARFARE

Geneva Protocol

320. The Geneva Protocol of 1925, banning chemical and biological warfare was ratified by the United Kingdom and many other countries. The United Kingdom will not, therefore, initiate the use of toxic chemical agents in war.

321. This section is concerned with defence against chemical and biological agents which might be employed by an enemy in conjunction with nuclear weapons.

Chemical warfare

322. A CW agent is any substance which will kill or incapacitate an enemy by its poisonous, blistering or irritating effects.

323. Chemical agents are classified according to their effects :—

(*a*) Nerve Agents—which attack the nervous system resulting in rapid disability and death. They are effective even in small doses.

(*b*) Blister Agents—which cause blisters on the skin and damage to the eyes and lungs, but do not cause death except in extreme cases. Blisters do not appear for some eight hours after exposure.

(*c*) Choking, Tear, Nose, Blood, Paralysing and Psycho-chemical Agents—these mainly cause casualties without permanent injury.

324. Most agents may be disseminated in any of the following forms :—

(*a*) Liquid droplets or spray, like rain.

(*b*) Liquid aerosols, like a fine mist, small enough to be inhaled.

(*c*) Vapour, like a gas.

(*d*) Very small particles of solids, like smoke.

APPENDIX A

NUCLEAR WEAPONS PLANNING GUIDE

Note : These tables are provided only as a guide ; they are based on " Artillery Training, Vol VIII, Pamphlets 1 and 2 ". However, various simplifications have been made to present the data concisely.

PART I—Family of Delivery Systems and Associated Weapons

	Range (Kms)		Associated Yield(s) (KT)									Burst Capabilities				Horizontal Delivery Errors (metres) (*a*)		
	Min	Max	0·5	1	2	5	10	20	50	100	200	High Air	Low-Air	Sur-face	Sub-Sur-face	Mini-mum Range	Medi-um Range	Maxi-mum Range
(*a*)	(*b*)	(*c*)	(*d*)	(*e*)	(*f*)	(*g*)	(*h*)	(*j*)	(*k*)	(*l*)	(*m*)	(*n*)	(*o*)	(*p*)	(*q*)	(*r*)	(*s*)	(*t*)
Medium Range Gun..	2	20		✓	✓							✓	✓			30	135	270
Long Range Gun ..	3	30			✓		✓					✓	✓			45	230	405
Small Free Rkt ..	3	25	✓	✓	✓		✓					✓	✓	✓		85	380	675
Large Free Rkt ..	7	40				✓		✓	✓			✓	✓	✓		190	595	1080
Medium Guided Missile	50	150				✓		✓	✓			✓	✓	✓		915	915	915
Heavy Guided Missile	50	300	In high KT and MT Range									✓	✓	✓		1830	1830	1830
Fighter ac		800(*b*)				✓	✓	✓	✓	✓	✓	✓	✓	✓		460	460	460
ADM	—	(*c*)	✓	✓		✓	✓		✓	✓				✓	✓			

Notes : (*a*) The radius around DGZ within which 90% of weapons can be excepted to explode.
(*b*) Radius of action.
(*c*) Can be fired by remote control.

APPENDIX A—*continued*

PART II—Casualty/Damage radii and Troop Safety distances for Low Airburst (*a*) (*b*) (*g*)
(Distances from GZ, in metres)

Yield (KT)	Exposed tps		Protected tps		Wheeled Vehs	Tanks and Arty	Tree blow-down Type II Forest	Induced radi-ation (*c*)	2nd degree burns on EXPOSED skin	Radius of Safety (*d*) (*g*)					
										Warned Exposed			Warned Protected		
	Prompt	Delayed	Prompt	Delayed						Neg	Mod	Emer	Neg	Mod	Emer
(*a*)	(*b*)	(*c*)	(*d*)	(*e*)	(*f*)	(*g*)	(*h*)	(*j*)	(*k*)	(*l*)	(*m*)	(*n*)	(*o*)	(*p*)	(*q*)
0·5 (*e*)	425	675	300	500	125	100	300	—(*f*)	325	1475	1200	950	1200	975	750
1	550	775	400	600	250	150	400	300	725	1675	1400	1200	1350	1200	950
2	625	875	450	675	350	200	500	350	1050	1750	1500	1300	1450	1200	950
5	800	1050	625	825	500	300	800	450	1550	2025	1700	1375	1625	1350	1100
10	875	1175	700	900	650	375	1000	500	2075	2600	1825	1525	1750	1500	1200
20	1125	1250	800	1000	875	500	1300	600	2675	3325	2225	1775	1850	1600	1325
50	1625	1625	1050	1175	1250	725	2100	700	3550	4875	3100	2500	2475	1825	1500
100	2125	2125	1025	1275	1650	950	2600	800	4950	6375	4125	3250	3125	2300	1650
200	2800	2800	1100	1425	2175	1275	3200	850	6300	8300	5500	4325	3900	2900	1700

(*a*) A low airburst precludes fall-out. This table is constructed to show the effects of weapons detonated at an IDEAL height of burst.
(*b*) The greatest likelihood of achieving an IDEAL height of burst occurs at the shortest ranges, where fuzing errors are smallest. Fuzing errors increase as the range increases. This fact, combined with the necessity to avoid fall-out, results in heights of burst being raised above the IDEAL at the greater ranges. The radii of damage to be expected will, therefore, be significantly smaller than those shown above.
(*c*) 2 rad/hr radius at 1 hr after burst (Type II soil).
(*d*) A buffer distance which allows for horizontal delivery errors must be added to these radii of safety. Normally the size of the buffer distance will be about the same as shown in columns (*r*)–(*t*) in PART I.
(*e*) Surface burst data.
(*f*) Fall-out governs.
(*g*) Safety figures apply to the offensive use only. Vulnerability of our troops to enemy attack must be deduced from the tables in the "Nuclear Handbook for Instructors and Staff Officers, 1963" (WO Code No. 9405).

c

26/GS Trg Publications/2894

AP No.
3395 (Pam 5)

ARMY CODE No.
70273 (Pam 5)

NUCLEAR, BIOLOGICAL AND CHEMICAL DEFENCE TRAINING

VOLUME 1

INDIVIDUAL TRAINING

PAMPHLET No. 5

PERSONAL PROTECTION AND DECONTAMINATION

This pamphlet supersedes "Nuclear Training", All Arms, Volume I, Pamphlet No. 1—Precautions Against Nuclear Attack (Army Code No. 9466, AP 3349), Section 6 and Section 7, paras 96 to 100, 102, 104 to 107 and 110 (*d*) and (*e*) and "Gas Training", 1951 (Army Code No. 8511, AP 3221A), Section 6 and Section 9 paras 1 to 7.

By Command of the Defence Council

L T Durrett

MINISTRY OF DEFENCE
21st March, 1967

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AMENDMENTS

Amendment No.	By whom amended	Date amended

DISTRIBUTION

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Regular Army	Scale E
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CCF, ACF	One each contingent
Defence NBC School	150 copies

In accordance with AP 113A, Appendix T

Royal Air Force	800 copies

CHAPTER 2—NUCLEAR PROTECTION

SECTION 3—**Protection against the immediate effects of nuclear weapons**

Precautionary measures

11. *General.* There may be no warning of a nuclear explosion and the damage from the immediate effects (heat, light, blast and initial nuclear radiation) will be complete soon after the explosion. Therefore, individuals must take precautionary measures when a nuclear attack is considered likely. These precautionary measures are as follows:—

(*a*) Remain under cover, eg., in shelters or cellars, in armoured vehicles or in slit trenches with overhead cover.

(*b*) Keep exposed skin covered, eg., collars must be buttoned up, sleeves must be rolled down and gloves worn. (CB clothing and the respirator will give additional protection to the skin against heat).

(*c*) Personal weapons and equipment must not be left outside cover. Articles left lying about may not only be damaged by heat and blast, but could themselves become dangerous missiles if blown about by blast.

12. *Prepared field defences.* The general principles to be followed when preparing field defences are as follows:—

(*a*) *Trenches.* These should be deep and narrow and have as near vertical sides as possible (*see* Fig 1).

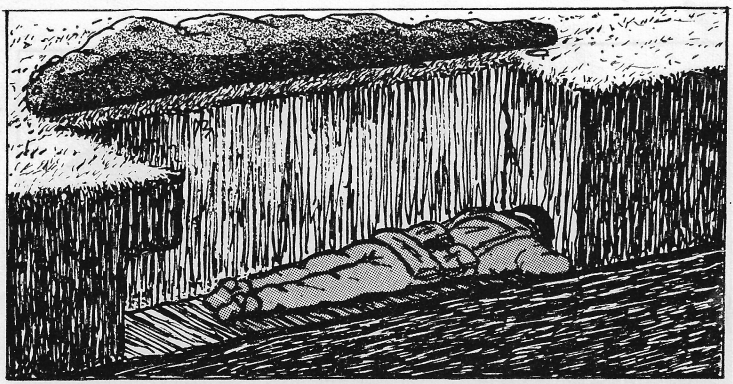

Fig 1—Protection in a slit trench

(*b*) Trenches should be as deep as the ground and the tactical situation will permit. Ideally, they should be four feet six inches deep and not more than two feet wide at the surface.

(*c*) *Overhead cover.* Some form of overhead protection is essential against the effects of heat, blast and radiation. The "Individual Protection Kit" has been designed to provide a lightweight means of supporting the overhead protection for an individual slit trench (*see* Fig 2).

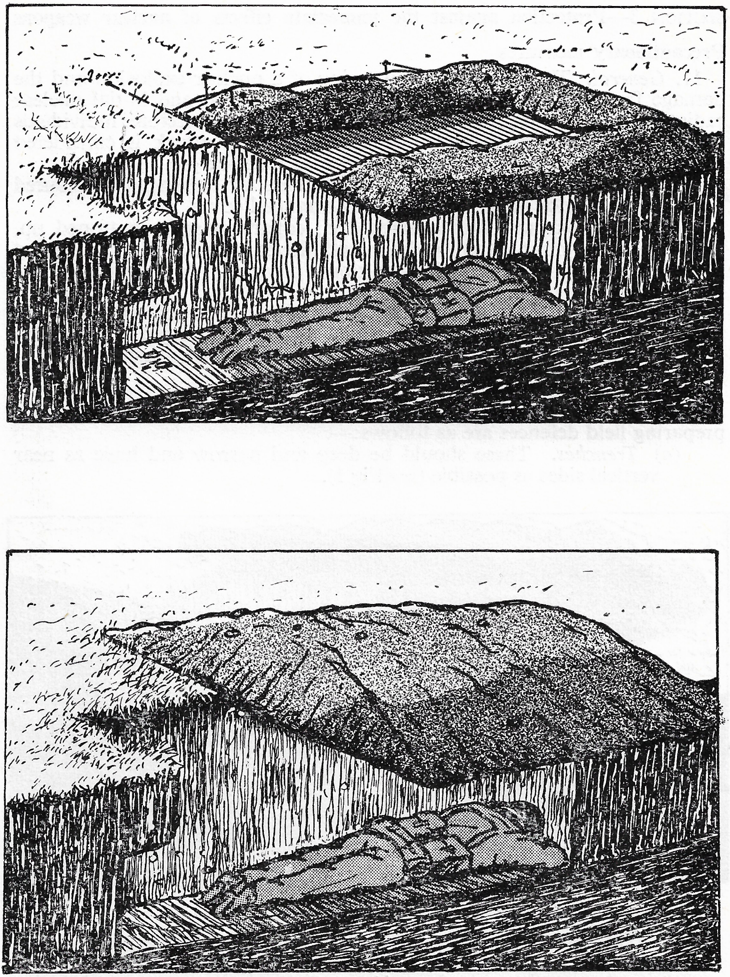

Fig 2—Using the individual protection kit

The value of more solid overhead protection is shown in Figure 3.

Fig 3—The value of overhead cover JAPAN, 1945

Fig 4—Protection against the effects of heat JAPAN, 1945

Protection in the open

13. Ideally, personnel should be sheltered in field defences such as those shown in Figures 1 and 2 or in cellars and basements. If in the latter, particular care must be taken to guard against the danger from falling buildings. All these types of shelter give excellent protection against the effects of heat, light, blast and nuclear radiation. Any cover, no matter how slight, which is between the individual and the explosion, will provide some degree of protection against the effects of heat. For example, even the slight cover of foliage will reduce the heat (*see* Fig 4). — HIROSHIMA

The pattern on the telegraph pole shows where leaves protected the pole from some of the heat effects. Some natural cover can often be found in open country. For example, a ditch, boulders, trees or similar solid objects may provide protection (*see* Fig 5).

A constant awareness of the value of such cover in providing instant protection against the effects of heat is important. This is because both heat and nuclear radiation travel at the speed of light and for all practical purposes can be said to be effective at once. It must be remembered, however, that these objects can become a danger as projectiles when the blast wave arrives. Initial radiation will remain a danger for approximately one minute after the explosion. Personnel in the open, should where possible, undertake their tasks immediately alongside suitable cover such as a ditch or fold in the ground. The effects of blast will not be felt at once since the blast wave travels at roughly the speed of sound, (one mile in five seconds); thus the time when the effects may be expected will vary with the distance from the explosion. The blast wave will be effective for a relatively longer period than blast caused by an HE explosion, ie., up to a second or two as compared with about one thousandth of a second for HE, and it is this fact that makes the blast from a nuclear explosion so dangerous.

Action on attack

14. *The immediate action drill.* The first indication of a nuclear attack will be a **blinding flash of light.** No matter whether in the open or in shelter, on sensing a flash the following immediate action must be taken:—

(*a*) **Close the eyes.**

(*b*) **Drop to the ground face downwards.**

(*c*) If the hands are unprotected keep them under the body.

Some do's and don'ts

15. *Do*

(*a*) *Before an attack*

(*i*) Remain under cover or in a shelter unless it is vital to be in the open.

(*ii*) Keep all exposed skin covered.

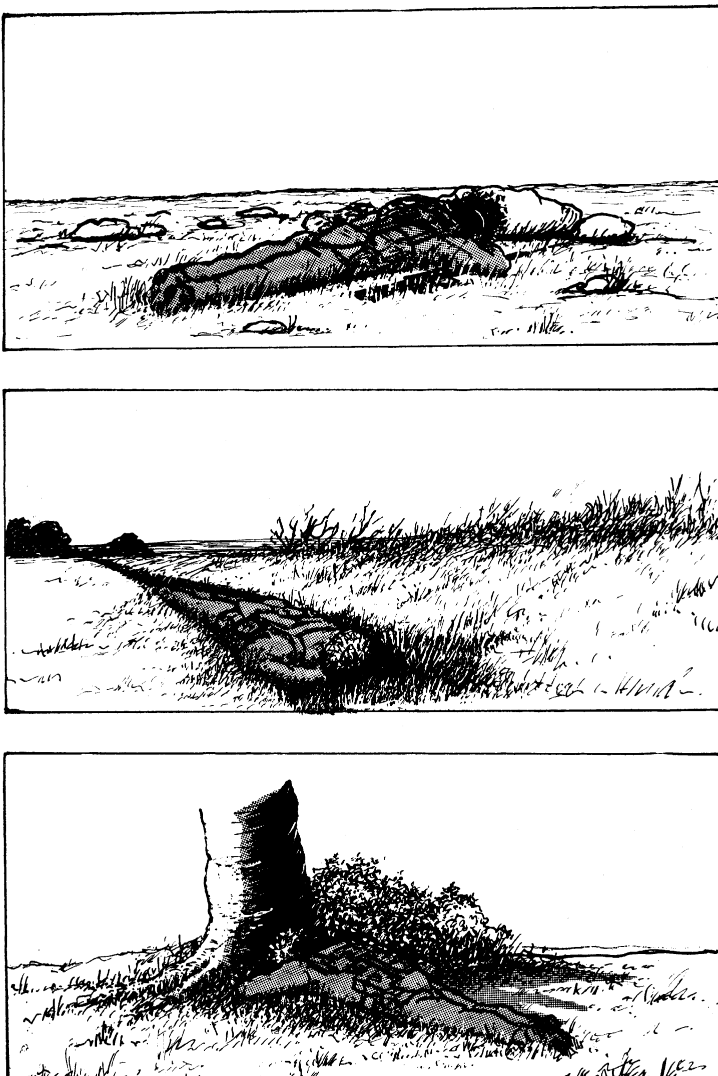

Fig 5—Gaining protection in the open

(*b*) *When an attack occurs*
- (*i*) Close the eyes at once on sensing a flash and keep them closed. If the hands are protected shield the face and eyes with the arms. Keep the head down.
- (*ii*) Drop to the ground immediately. If in the open and alongside suitable cover, use it.
- (*iii*) Remain flat on the ground until the shock wave has passed.
- (*iv*) If in a building, after taking the immediate action at once roll clear of any opening and get under, for example, a nearby table, desk or bed and lie flat.

16. *Don't*
- (*a*) Don't look at the flash.
- (*b*) Don't try to decide the location of the explosion until the shock wave has passed.
- (*c*) Don't run for cover when the explosion occurs.

Paras 17–20 *Reserved.*

SECTION 4—**Protection against residual nuclear radiation**

General

21. Nuclear explosions may cause residual radiation in the form of:—
- (*a*) *Induced radiation.* Radiation which is produced from the area of ground in the immediate vicinity of the explosion.
- (*b*) *Fallout.* Radioactive dust which may be deposited over a wide are for some hours after the explosion.

Reduction of the hazard

22. The danger from nuclear radiation gradually lessens with time. When operational requirements permit the individual can also reduce the hazard as follows:—
- (*a*) *Exposure time.* By keeping to a minimum the time exposed to radiation, eg:—
  - (*i*) to stay under cover, (*see* sub-paras (*b*) and (*c*) below;
  - (*ii*) to return to cover immediately after properly completing tasks which have been carried out in the open;
  - (*iii*) as soon as possible to remove radioactive dust or mud etc. from clothing.
- (*b*) *Distance.* By keeping as far away from radioactive contamination as possible, eg:—
  - (*i*) to remain in the cellar, basement, or inner room of a building rather than in a room near the roof or one with an outer wall;
  - (*ii*) to stay away from the outside walls of a building;
  - (*iii*) prevent radioactive dust from entering a slit trench by closing up the exits etc.
- (*c*) *Shielding.* By placing the thickest possible shield between the body and the source of radiation, eg:—
  - (*i*) to get underground or into an armoured vehicle;
  - (*ii*) to take cover inside the thickest building.

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W.O.
CODE No.
11679

RECOGNITION HANDBOOK of FOREIGN WEAPONS & EQUIPMENT

CHEMICAL WARFARE & FLAME EQUIPMENT

★ U.S.S.R. ★

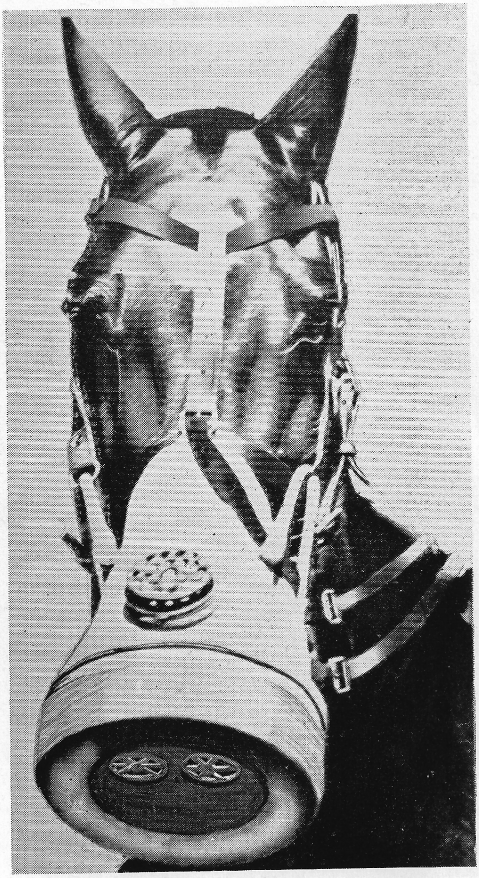
VOLUME 1

PART 6

M.I.10. THE WAR OFFICE

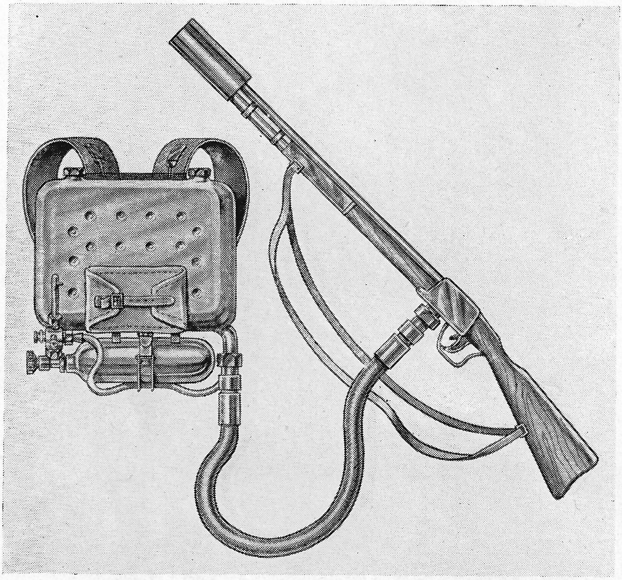
SHLEM-MASKA 1
(with KR-MO-2 canister)

KSP-6 HORSE RESPIRATOR



The KSP-6 model is a dry type respirator with a large cylindrical filter canister fixed to a facepiece made of stockinette covered rubber. Note the two air inlets in the bottom of the filter with wheel-like framing, and the outlet valve on the front protected by a perforated metal grid.

ROKS-2 MANPACK FLAMETHROWER



The rectangular metal fuel container closely resembles a normal pack. The flame gun itself is in the form of a rifle. Ejection is by compressed air, the cylindrical air bottle being attached horizontally beneath the pack. Above the air bottle, attached to the fuel container, is a canvas tool bag. The double trigger action first fires an incendiary cartridge by depressing the small trigger and then releases the flow of fuel by depressing the main trigger.

Weight (charged) :	50 lb.
Capacity :	2 gals.
Number of shots :	6-8 of 1 second duration.
Range :	40-50 yards.

Fuel may be diesel oil or petrol mixed with aluminium stearate.

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CAMT 1-43

CANADIAN ARMY

MANUAL OF TRAINING

NOTES ON THE INFLUENCE OF NUCLEAR WEAPONS ON TACTICS

(PROVISIONAL)

1955

PREPARED UNDER THE DIRECTION
OF
THE CHIEF OF THE GENERAL STAFF

ARMY HEADQUARTERS
OTTAWA

NOTES

ON

THE INFLUENCE OF NUCLEAR WEAPONS ON TACTICS

PROVISIONAL

To be read in conjunction with CAMT 1-42—ATOMIC WEAPONS, their Characteristics and Employment

Introduction

1. Nuclear weapons may now be considered as part of the normal armaments of the major powers. The introduction of these weapons to the battlefield may not take place at the outbreak of war, and if the campaign is small and localized they may not be used at all. It is quite evident that we must be prepared to fight a nuclear war in addition to being ready for war with conventional weapons. The introduction of nuclear weapons may be instantaneous and could come without warning. Should a major war break out it is likely that nuclear weapons will be available to both sides in ample supply. In such a war is is improbable that a commander will be unduly restricted in the number or types of missiles he can use.

2. Weapons now available, or under development, have a variety of sizes and means of delivery. It must be assumed that a major power will be able to employ the size and type of missile most suited to a particular task.

SECTION I—GENERAL

3. In planning future operations, the commander will seek to entice or force his enemy to deploy in such a manner that he presents a favourable nuclear target while at the same time deploying his own force in such a way that it does not present a favourable target to the enemy. To the two accepted principal determinants of battle—firepower and movement will be added a third—control.

Ground

4. Ground will continue to be of major importance in the tactical battle. Certain types of ground, such as hilly features can reduce the

effects of nuclear explosions. Ground is also of importance to give observation; to secure essential communications; to restrict or canalize enemy movements and to cover the movement and operation of reserves.

Principles of War

5. The accepted principles of war remain applicable to nuclear warfare as discussed below.

(*a*) *Maintenance of the Aim* = BREAK ENEMY'S WILL TO FIGHT!!

In nuclear warfare opposing commanders will always be trying to force their opponents to concentrate, thus providing a suitable target for nuclear weapons. In any plan this is the dominant factor.

(*b*) *Surprise*

The instantaneous effect of a nuclear explosion is in itself an application of surprise. By careful planning the commander may exploit this surprise by rapid ground action before the effects wear off.

(*c*) *Offensive Action* = DESTROY ENEMY CAPABILITY!!

The nuclear weapon is capable of turning defeat into victory; defence into offence. Its effects must be exploited fully and immediately.

(*d*) *Concentration*

In nuclear warfare concentration will be in terms of time rather than space. The use of a nuclear weapon is in itself a great concentration of effort. Its effects must be co-ordinated with the other resources available to the commander in order to achieve the fulfilment of his plan.

(*e*) *Maintenance of Morale* = DETERMINATION!!

The morale effect of the use of nuclear weapons may be great. Every soldier must be taught what to expect and how to protect himself. The rallying of men on the spot after a nuclear attack should be immediate and will place greater responsibility on junior leaders.

(*f*) *Security*

The use of nuclear weapons will, no doubt, bring greater dispersion of forces than in conventional warfare. This will increase the security problem. A commander will require to

keep his force concentrated in terms of time with consequent emphasis on better communications, mobility and flexibility. The principle of security implies that no action of the enemy will divert a commander from his aim and he must therefore be prepared to receive and withstand enemy attack by nuclear weapons.

(*g*) *Mobility and Flexibility*

The rapid concentration of effort required in nuclear warfare will call for greater mobility and flexibility. Command and control techniques must, therefore, be simple and efficient. All arms and services must be able to move freely and quickly by night.

(*h*) *Economy of Effort*

Nuclear weapons will present many opportunities for a numerically weaker force to defeat a stronger one. Such weapons may alter the composition of forces needed to obtain success.

(*j*) *Administration*

In nuclear warfare the logistical organization will be more vulnerable than ever before to enemy action. Tactical aims may be attained by imposing administrative impotence on an enemy. Dispersion is essential, as well as streamlining the supply organization. Economy and restraint in the use of war material will be required at all levels.

Command and Control

6. The decision to employ nuclear missiles rests with the commander who has been allocated these weapons and delegated the authority to employ them. At present this will be the Army or Corps Commander. Normally Army Headquarters/Tactical Air Group will control the allotment of nuclear missiles.

7. Requests for nuclear fire support may originate with any tactical commander who has identified a suitable target or whose task will be materially assisted by such support. The decision for employment will depend upon supply and upon information from reconnaissance and intelligence agencies.

Reconnaissance

8. In nuclear warfare reconnaissance takes on a new significance. Air reconnaissance will be required by visual, photo and electronic means.

There must also be a system for the rapid evaluation and assessment of all information received so that a commander may know when a suitable target for nuclear weapons has been located.

9. Every available method of ground reconnaissance, supplemented by the use of light aircraft, must be used in the forward areas. All troops must be made thoroughly aware of the importance of recognizing and passing back any information which may assist our intelligence staffs to assess and evaluate possible targets. Patrol activity must be increased to provide continuous coverage of the enemy front by observation and for the capture of PWs. Trained reconnaissance troops sufficiently strong to fight for information on a considerable scale will be required for deep and medium reconnaissance. Contact with the enemy must be continuous.

Intelligence

10. The intelligence resources of the commander in nuclear warfare must be of a high order. It is essential that the time required to secure, report interpret, evaluate and disseminate information is reduced to a minimum. In order that our own nuclear weapons may be used with maximum effect, information from reconnaissance elements must be processed quickly. In addition emphasis will be placed on the detection of enemy intentions regarding the use of nuclear weapons so that our troops may take protective action. To this end technical staffs of personnel trained in scientific aspects of nuclear warfare will be required to assess and evaluate targets and enemy preparations and to work out technical details.

11. As surprise employment of a nuclear weapon increases its tactical effectiveness, special emphasis will be placed on counter intelligence measures, both active and passive, to conceal our activities and to neutralize or detroy the effectiveness of enemy intelligence. These measures will include air defence to deny enemy aerial observation and smoke to cover our movements.

SECTION II—SELECTION OF TARGETS

General

12. The tasks selected for nuclear weapons, will be primarily those which cannot be performed as effectively by conventional weapons. Two factors are considered in selecting suitable targets.

(*a*) their importance in relation to the tactical situation,

(*b*) their strength and composition.

13. The importance of targets will be judged on their relationship to the overall plan. Under certain circumstances, nuclear attack may well be justified on targets which of themselves would not be considered suitable.

14. Selection of suitable targets will depend on early and complete information. The planning of a nuclear strike is time consuming and will include considerations of weather, type of burst, means of delivery, position of our own troops with relation to the target and possible psychological effects of the explosion on enemy, own troops and local population.

Types of Targets

15. Targets are of three categories:

(*a*) *Pre-planned targets*

These are targets which have been indentified before the operation commences and which can be attacked at a specific time and place. These will include airfields, administrative installations, defiles and major bridges, known enemy positions and headquarters.

(*b*) *Contingent targets*

These are targets for which a considerable amount of data can be prepared in advance and which can be engaged relatively quickly. These will include likely enemy concentrations or assembly areas, possible gun areas, river crossing sites and old bridgeheads.

(*c*) *Opportunity targets*

These are targets which cannot be forecast and which may be only in existence for a short time. The successful engagement of opportunity targets will depend on early recognition, and adequate communications; to these must be added an efficient system for processing and evaluating information received. If it is possible to pre-plan for the rapid delivery of nuclear weapons by the air force, this may be the best way to engage "opportunity targets". However, because of the fleeting nature of these targets, it may be more advantageous to use guided missiles or long range artillery with nuclear warheads, since these can be brought more quickly onto the target.

1951 RESTRICTED WO, Code 8666.

U.K. WAR OFFICE:

FIELD ENGINEERING AND MINE WARFARE

PAMPHLET No. 2

FIELD DEFENCES AND OBSTACLES

PART I — ALL ARMS

INTRODUCTION

1. It is a primitive instinct of man to lie down and take cover when under fire ; but in this position he cannot use his weapons and hit back. Field defences are therefore constructed by a disciplined army to enable the soldiers to use their weapons offensively against the enemy, while at the same time deriving protection against the enemy's fire.

2. It is essential that every soldier should know how to construct and conceal field defences which will confer upon him this ability to use his weapons offensively while reducing to a minimum his own risk of becoming a casualty.

3. This pamphlet describes the principles and practice of constructing and concealing field defences and obstacles mainly from the engineering aspect. The tactical principles of siting field defences and obstacles are covered in the relevant Military Training and Infantry Training pamphlets, parts of which are quoted here to make this pamphlet, in itself, complete.

CHAPTER 1

GENERAL CONSIDERATIONS IN THE CONSTRUCTION OF FIELD DEFENCES

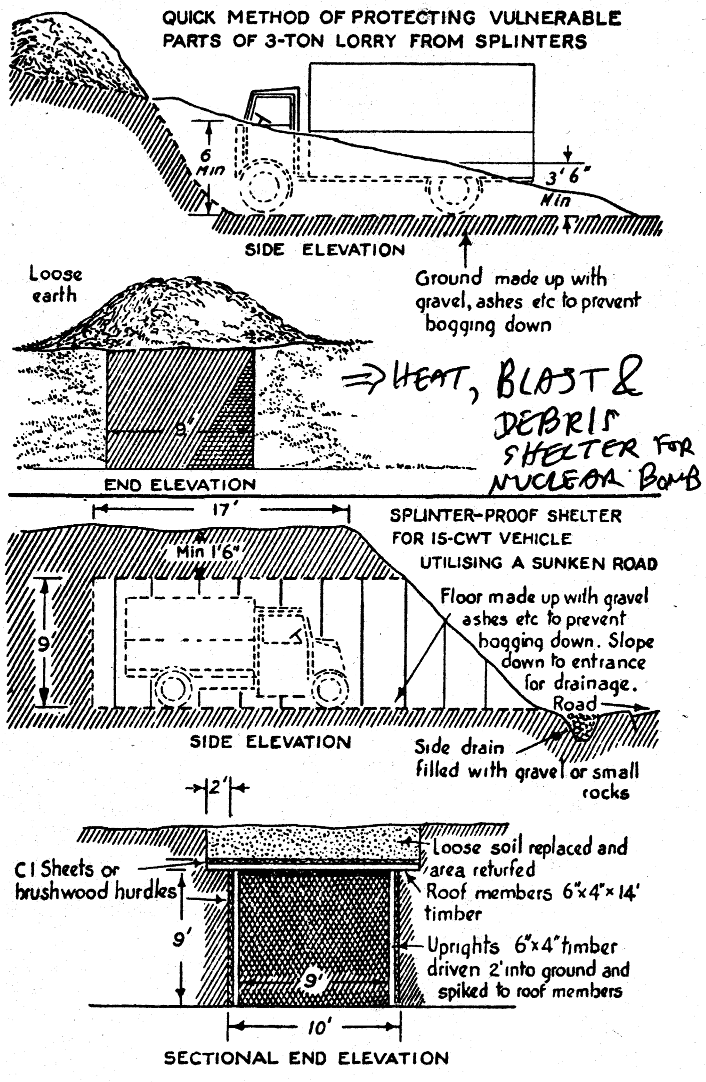
SECTION 1.—ALL ARMS RESPONSIBILITIES

1. All arms are responsible for the provision of their own field defences. This responsibility covers:—

(*a*) The siting, construction (including revetting and draining), and concealment of weapon pits and light splinter-proof shelters.

(*b*) Siting, construction and concealment of obstacles, and clearance of the field of fire except where explosives are required for the purpose.

(*c*) Improvements to communications, *eg*, crawl trenches, tracks.



⇒ HEAT, BLAST & DEBRIS SHELTER FOR NUCLEAR BOMB

Fig 33.—Digging-in vehicles (ii)

11. Fig 34 gives a suggested layout for a divisional tactical HQ.

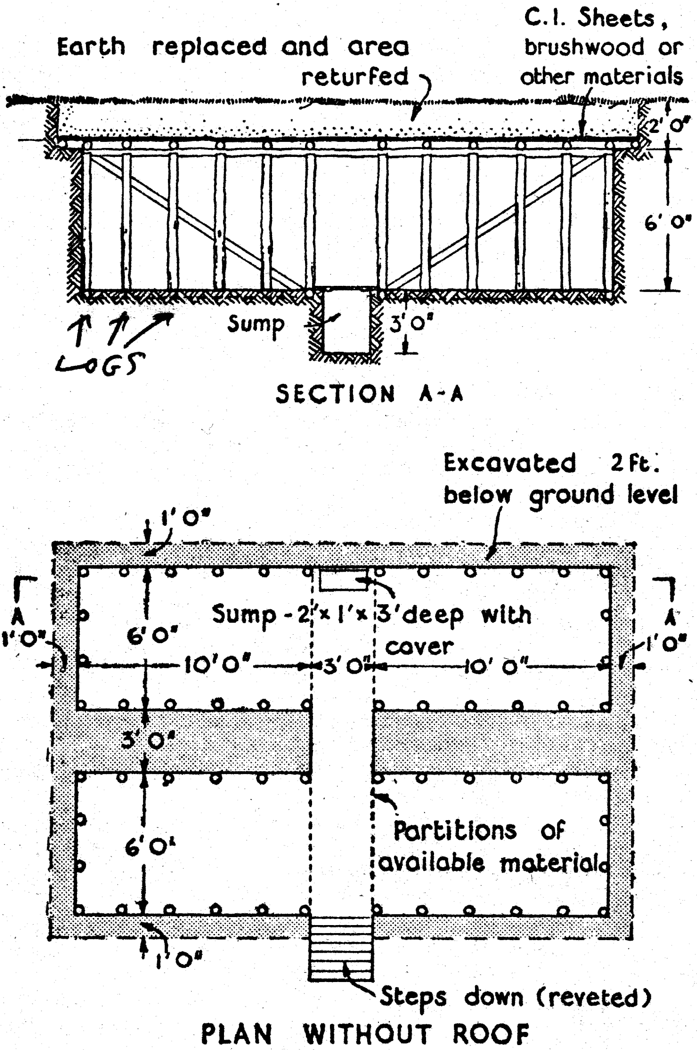


Fig 34.—Divisional tactical HQ splinter-proof shelter

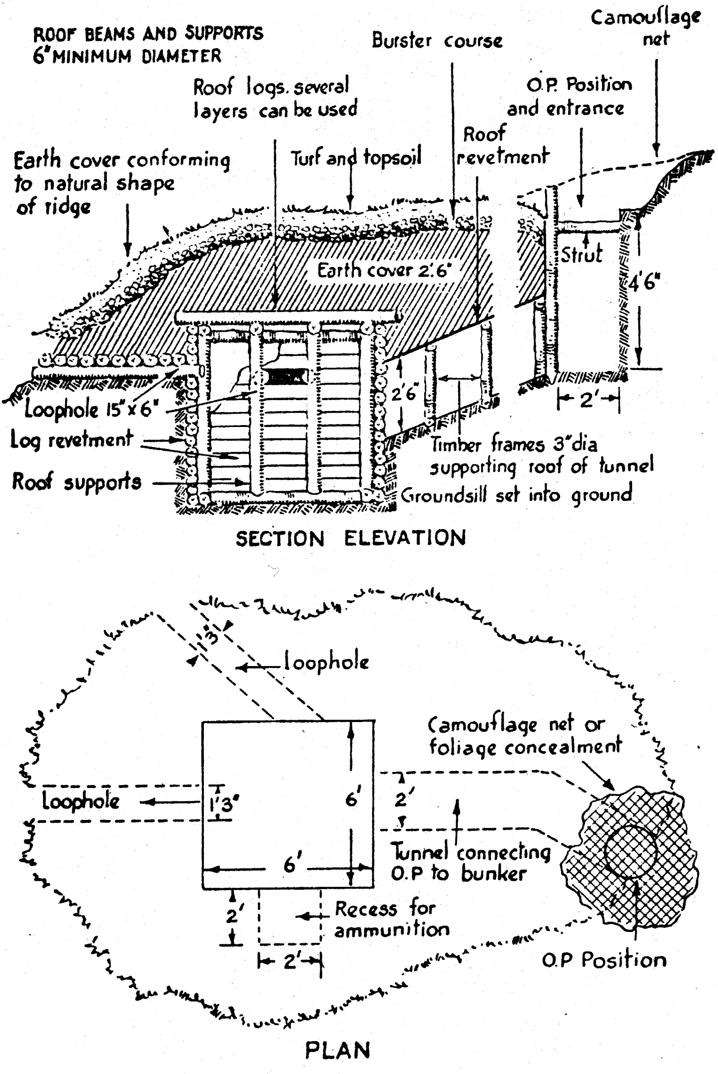


Fig 37.—Bunker position

APPENDIX C

PROTECTION REQUIRED AGAINST DIFFERENT TYPES OF FIRE

The table below shows the thickness of materials required to resist penetration by various missiles.

Type of material	Type of material in inches						
	Horizontal trajectory				Vertical trajectory		
	SA bullets, AP and HE fragments	AP shot		Air-burst or tree-burst HE fragments	Direct hit from mortar bombs up to 10 lb in weight	Direct hit from shell up to 40 lb in weight	Direct hit from heavy shell or aircraft bomb up to 500 lb in weight
		6-pr	17-pr				
(*a*)	(*b*)	(*c*)	(*d*)	(*e*)	(*f*)	(*g*)	(*h*)
Earth or chalk	60	360	684	18 (w)	30	90	720 (x)
Sand	30	360	684	18 (w)	30	90	720 (x)
Brick	18	(y)	(y)	18 (w)	(y)	(y)	(y)
Timber	60 (x)	(y)	(y)	9 (x)	(y)	(y)	(y)
Shingle (between boards)	12	240	456	12	(y)	(y)	(y)
Unreinforced concrete ..	12	(y)	(y)	4	9	18	60
Reinforced concrete ..	12	60	114	4	9	15	48
Mild steel	1¾	(y)	(y)	½	2	(y)	(y)
Ice concrete	6	(z)	(z)	(z)	(z)	(z)	(z)
Frozen packed snow ..	36	(z)	(z)	(z)	(z)	(z)	(z)

NOTES.—(w) 12 inches gives nearly full protection.
(x) Very variable.
(y) Information of no value.
(z) Information not yet available.

APPENDIX E

STORES REQUIRED FOR COMPANY HQ COMMAND POST SHELTER

Timber round three-inch diameter foot run	210
„ „ four to six inches diameter foot run	180
CGI sheets or other revetting metal for roof, square feet ..	40
CGI sheets or other revetting metal for walls, square feet ..	190
Wire 14 SWG, feet	1,000
Spikes nine-inch	50
Nails six-inch	40
„ three-inch	100
Hessian for curtains four feet by two-feet six-inch sheets ..	2
Pickets forestry two feet six inches long by three-inch diameter ..	10

APPENDIX F

SIZE OF ROOF BEAMS

Spacing of beams two feet centre to centre.

1. **Rectangular section timber**

Size of timber (ins)	Maximum span (ft)	
	For 1 ft 6 ins earth	For 3 ins earth
6×2	5	4
9×2	8	6
7×2½	6	5
6×3	6	5
8×3	8	6
9×3	9	7
4×4	5	4
5×4	6	5
7×4	9	7
9×4	12	9
5×5	6	5
7×5	9	7
9×5	13	10
6×6	9	7
8×6	12	9
8×8	15	11
9×9	17	13

2. Circular section timber

Size of timber (ins)	Maximum span (ft)	
	For 1 ft 6 ins earth	For 3 ins earth
4	3	3
5	5	4
6	7	5
7	9	7
8	11	8
9	13	10

3. RSJs

Size of timber (ins)	Maximum span (ft)	
	For 1 ft 6 ins earth	For 3 ins earth
6×3	18	13
5×3	16	12
4×3	14	10
3×3	11	8
4×1¾	9	7
3×1½	7	5
80 lb rail	23	17

The above tables are calculated for a working stress in timber of 1,340 lb/sq inch and in steel of 7½ tons/sq in. Weight of earth has een taken as 100 lb/cu ft.

Infantry
THE PROFESSIONAL MAGAZINE FOR INFANTRYMEN

LEADER'S HANDBOOK

Published at the US Army Infantry School
by
INFANTRY Magazine
July 1962

TROOP LEADING STEPS

1. BEGIN PLANNING
   a. Plan the use of available time.
   b. Begin the estimate of the situation.
      (1) Analyze terrain from map, sketch, or aerial photograph for:
         (a) Observation and fields of fire.
         (b) Cover and concealment.
         (c) Obstacles.
         (d) Critical terrain features.
         (e) Avenues of approach.
      (2) Analyze enemy strength, locations, dispositions, and capabilities.
   c. Make preliminary plan.
2. ARRANGE FOR:
   a. MOVEMENT OF UNIT (Where, when, how)
   b. RECONNAISSANCE (Select route, schedule, persons to take along, use of subordinates)
   c. ISSUE OF ORDER (Notify subordinate leaders of time and place)
   d. COORDINATION (Adjacent and supporting units)
3. MAKE RECONNAISSANCE: (Continue estimate, complete terrain analysis. If necessary change preliminary plan)
4. COMPLETE PLAN: (Receive recommendations, change preliminary plan as needed, prepare order)
5. ISSUE ORDER: (Include terrain orientation)
6. SUPERVISE

ESTIMATE OF THE SITUATION

1. MISSION
2. SITUATION AND COURSES OF ACTION
   a. Weather, terrain, comparison of enemy and friendly situation.
   b. Enemy capabilities.
   c. Own courses of action.
3. ANALYSIS OF OPPOSING COURSES OF ACTION
   (Analyze effect of each enemy capability on each of own courses of action)
4. COMPARISON OF OWN COURSES OF ACTION
   (Summarize advantages and disadvantages of own courses of action)
5. DECISION (Who, what, when, where, how and why)

CHARACTERISTICS OF INFANTRY WEAPONS

WEAPON & WEIGHT	Type of Feed	Method of Operation	Cyclic(C) or Maximum Rate (M) of fire (Rds per Min)	Sustained Rate of Fire (Rds per Min)	Maximum Effective Rate of Fire (Rds per Min)	Maximum Range (Nearest 25 Meters)	Maximum Effective Range (Meters)	Approximate Effective Bursting Area (in meters)	REMARKS
HAND GRENADES Fragmentation M26A2 1 WP M34 1.5						50 35		15 25	May be fired as a Rifle Grenade using M1 A2 Projection Adapter.
WEAPON ANTIPERSONNEL M18A1 Claymore 3.5				Controlled Electric or Uncontrolled Trip Wire	1 Shot	200	Most Effective 50	Directional Fragmentation 90° sector w/radius of 50	Check TC7-3 for back-blast effects. When used uncontrolled Claymore must be treated as a mine and its location recorded
US RIFLE 7.62mm, M14 9.7	20 Rd Mag	Gas Operated Semi-auto and auto	700-760 (C)	15 Semiautomatic 20-Automatic	20-40 Semiauto 40-60 Auto	3200	460		Full auto capability requires installation of selector. Sustained rate based on limited tests. Bipod is a major item and used in conjunction with rifle when used as an auto rifle.
US RIFLE, 7.62mm, M14 WITH RIFLE GRENADE LAUNCHER M76, HEAT RIFLE GRENADE, M31 AND SIGHT M15 10.5	Manual	Manual Single Shot	4 (M)	4	2	275	125		Grenade launcher w/M15 sight weighs approx 1 lb. Complete round weighs approx 1.5 lbs.
MACHINEGUN, 7.62mm, M60 23	Belt Metallic Link	Gas Operated Auto	550 (C)	100	200	3200	1100		Max effective range limited by gunner's ability to see and adjust on target.
40mm GRENADE LAUNCHER M79 6.25		Percussion Type Single Shot				400	400	5	Min safe range: Combat: 31 meters Training: 50 meters
US CARBINE CAL .30, M2 5.5	30 Rd Mag	Gas operated Semi-auto and auto	750-775 (C)	40-60	40-60	2025	250		To be replaced by M14 Rifle. May be equipped with sniperscope infrared set No 1 20,000 Volts.
US RIFLE CAL .30, M1 9.5	8 Rd Clip	Gas Operated Semi-automatic		8-10	16-24	3200	460		To be replaced by M14 Rifle.

US RIFLE, M1, w/GRENADE LAUNCHER M7A3, HEAT RIFLE GRENADE M31 & SIGHT M15 10.5	Manual	Manual Single Shot	4 (M)	4	2	275	125		Complete round weighs approx 1.5 lb.
BROWNING AUTOMATIC RIFLE CAL .30 M1918A2 19.5	20 Rd Mag	Gas operated auto	350 (C) Slow 350 (C) Fast 120-150 (M)	40-60	40-60 (2-3 rd bursts) 120-150 (20 rd bursts)	2750-3200	460		To be replaced by M14 rifle with M2 bipod.
BROWNING MACHINE GUN, CAL.30, M1919A6 33	Belt Metallic Link	Recoil Auto	600-675 (C)	75	150	3200	1100		Max effective range limited by gunner's ability to see and adjust on target. May be fired from tripod mount. To be replaced by M60.
MACHINEGUN, CAL .50 HB, M2 126	Belt Metallic Link	Recoil Semiauto and Auto	500 (C)	40	100	6800	725 AA Target 1825 Ground Target		
PORTABLE FLAME-THROWER, M2A1-7 40.5	Fuel propelled by gas under pressure	Manual	Continuous Discharge 6-9 Sec	Continuous Discharge 6-9 Sec	Continuous Discharge 6-9 Sec	25 Unthickened Fuel 50 Thickened Fuel	Same as Maximum		Contains 4.5-4.75 gal of fuel weighing 25 to 29 lbs.
M4 INCENDIARY BURSTER 2.25		Blasting cap fuze or any standard firing device						5 gal container 20-30 55 gal container 85	Any size container. Fired electrically or mechanically by fuze, blasting cap or any standard firing device.
81mm MORTAR, M29 WITH MOUNT, M23A3 93.5	Muzzle Loading by Hand	Drop Fire	12 (M) for 2 Min w/Charge 8	3 with Charge 8		3650	3650	25x20(A)	Ammunition weighs 7-12 pounds (A).
4.2-IN MORTAR, M30 WITH MOUNT, M24A1 640	Muzzle Loading by Hand	Drop Fire	20 (M) for First 2 Minutes 6 Per Min Next 20 Min	2		5500	5500	40x15(A)	Ammunition weighs 26-29 pounds. (A)

TANK - ANTITANK - RECOILLESS WEAPONS

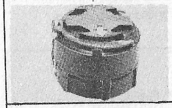
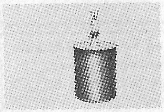
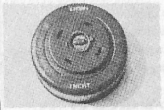
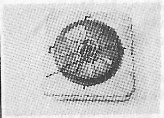
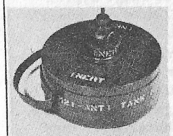
Cyclic Rate of Fire ---------Rate at which weapon fires automatically.
Maximum Rate of Fire (M) ---Greatest rate at which well-trained gunner can fire.
Sustained Rate of Fire -------Rate at which weapon can fire indefinitely without seriously overheating.

Maximum Effective Rate ---- Rate at which trained gunner can fire and obtain reasonable number of hits (50%).
Maximum Range -----------Greatest distance weapon will fire.
Maximum Effective Range --Greatest distance at which gunner may be expected to fire accurately.

WEAPON wpn.wt. /ammo. wt.	RATE OF FIRE (Per Minute) MAXIMUM	SUSTAINED	MAXIMUM RANGE METERS	EFFECTIVE RANGES METERS ARMOR-DEFEATING	OTHER TARGETS	APPROX BURSTING AREA
3.5 IN ROCKET LAUNCHER M20A1B1 13/9	12-18	4	825	H-185-Moving (1, 8) H-275-Stationary (1, 2, 8)	275 (1, 2, 7)	18 x 9 (HEAT)
106mm RIFLE M40A1 w/SPOTTING RIFLE CAL .50 M8 460/37	1 per 6 sec not to exceed 5; then 15 min cooling period	1 per min indef	7700	H-1100(3) H-2200 yds(4)	2200 yds (11) as determined by nature of target	14m radius (HEP-T)
90mm FULL TRACKED SELF-PROPELLED GUN, M56 15,000	6	1	17,154	H-4600-HEAT(5, 8) L-2250-APT(5, 8, 16) M-1450-APT(5, 8, 16) H-925-APT(5, 8, 16) M-2250-HVAP(5, 8,16) H-1475-HVAP(5, 8, 16)	4600(4)	37 x 6(HE)
76mm GUN TANK M41A1 (Walker) 52,000	7	1	21,607	L-1825-APT(5, 8, 16) M-1250-APT(5, 8, 16) H-926-APT(5, 8, 16) H-1825-HVAP(5, 8, 16) H-1825-HVAP-DS-T (5, 8, 16)	4600(4)	30 x 5(HE)
90mm GUN TANK M48A2 104,000	7	1		H-4400-HEAT(5, 8) L-2250-APT(5, 8, 16) M-1450-APT(5, 8, 16) H-925-APT(5, 8, 16) M-2250-HVAP(5, 8,16) H-1475-HVAP(5, 8,16)	4400(4)	37 x 6(HE)
SS-10 ANTITANK GUIDED MISSILE 15/13	2-3 (9)	2-3 (9)	1600 (10)	H-1600(8, 10)	450 to 1600	
90mm RIFLE M67 (MAW) 35/9	Unknown	Unknown	Unknown	(14)	700(11)	Unknown
M72, LIGHT ANTITANK WEAPON 66mm (LAW) 4.5	(13)	(13)	1000	250	325(11) (12)	(14)
105mm GUN TANK, M60 102,000	7	1	22,290	H-4400-HEP(5, 8) H-2000-APDS(5,8,16) H-4400-HEAT(5, 8)	4400	(14)
ENTAC ANTITANK GUIDED MISSILE 37.5/26.7	2-3 (9)	2-3 (9)	2000 (15)	H-2000(8, 15)	400 to 2000 (12, 15)	Unknown

REMARKS

1. Recommended by USAIS based on skill of average gunner.
2. Max eff range for firing in prone position.
3. Max eff range of weapons system.
4. Max sight graduations primary direct fire sight.
5. Armor defeating capabilities limited by capability of ammo, nature of target, observation, visibility.
6. Approx wt to nearest 25 lbs.
7. Against area targets 825m.
8. Eff armor defeating ranges against L-Light, M-Medium, H-Heavy tanks.
9. Depending on flight time to target.
10. Min practical range 450m based on gunner's ability.
11. Max range graduations on sight.
12. Primarily an AT wpn; should be conserved for this purpose.
13. Launcher discarded after firing.
14. Classified information.
15. Min practical range approx 400 meters based on gunner's proficiency.
16. Kinetic energy rds are the primary armor-defeating tank rounds. Altho their max eff ranges are greater, they are treated as though their max eff ranges were 1500m or less. This is normal US Army tank fighting area.

MINE		TYPE	ACTION REQUIRED TO DETONATE	EFFECT
	MINE, ANTI-PERSONNEL, NONMETALLIC, M14	Stationary blast	Individual steps on mine (15 or more lbs of pressure).	Individual detonating mine becomes non-lethal casualty.
	MINE, ANTI-PERSONNEL, M16	Bounding fragmentation (projectile jumps)	Individual stumbles on trip wire or steps on fuze (3 or more lbs of pull or 8 or more lbs of pressure).	Half of personnel w/in radius of 30 meters become casualties.
	MINE, ANTI-TANK, M15	Blast	Vehicle runs over pressure plate (300 or more lbs of pressure).	Immobilizes heaviest armor by breaking tracks.
	MINE, ANTI-TANK, NON-METALLIC, M19	Blast	Vehicle runs over pressure plate 350 or more lbs of pressure).	Immobilizes heaviest armor by breaking tracks.
	MINE, ANTI-TANK, M21	Shaped Charge	W/extension rod, veh runs over pressure plate with 290 lbs or more pressure. W/extension rod, a min horizontal force of 4 lbs against extension rod will cause mine to detonate.	w/o extension rod, immobilizes heaviest armor by breaking tracks. W/extension rod explosive charge propels steel plate with sufficient force to penetrate tank belly killing occupants.

CONVERSION FACTORS

Multiply	by	to obtain
centimeters	.03281	feet
centimeters	.3937	inches
cubic feet	.02832	cubic meters
cubic meters	35.31	cubic feet
degrees	60	minutes (circular)
feet	30.48	centimeters
feet	.3048	meters
feet per minute	.01136	miles per hour
feet per second	.6818	miles per hour
gallons (British)	1.201	gallons (US)
gallons (US)	.8327	gallons (British)
inches	2.540	centimeters
inches	.08333	feet
inches	1000	mils
kilometers	.6214	miles
meters	100	centimeters
meters	3.281	feet
meters	39.37	inches
meters	1.094	yards
miles	5280	feet
miles	1.609	kilometers
mils	.001	inches
square meters	10.76	square feet
square meters	1.196	square yards
square miles	2.590	square kilometers
square yards	.8361	square meters
temp (°C) + 17.8	1.8	temp (°F)
temp (°F) — 32	.5556	temp (°C)
yards	.9144	meters

CONDUCTING PRACTICAL WORK

1. Give detailed directions to students.
2. Be sure that students know the "how" and "why."
3. Inform students as to standards expected.
4. Allow sufficient time to attain standards set.
5. Keep instruction first, production secondary.
6. Supervise closely and constantly.
7. See that men perform correctly.
8. Learn each step before progressing to the next.
9. Reteach and redemonstrate when need arises.
10. Stress both speed and accuracy after procedure is learned.
11. Make application realistic.
12. Ask pertinent questions during practical work.
13. Be patient and encouraging.
14. See that all safety precautions are observed.
15. Show positive interest in student progress.
16. Have good students aid slower students.
17. Help students evaluate their performance.
18. Rotate students from one job to another.

HOW TO CONDUCT A CRITIQUE

(All applicatory exercises should close with a critique)

1. State the objective of the lesson or problem.
2. Review procedures employed.
3. Evaluate strong points and suggest improvements.
4. Control the group in discussion.
5. Summarize.

CRATERING CHARGES

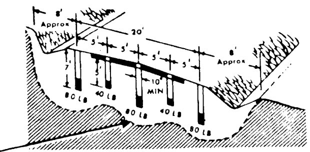
DELIBERATE ROAD CRATER

ALTERNATE 5-FOOT AND 7-FOOT HOLES SPACED AT 5-FOOT INTERVALS.

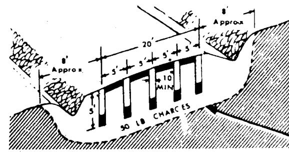
(END HOLES ALWAYS 7-FOOT)

USE 40-LB CHARGES IN 5-FOOT HOLES AND 80-LB CHARGES IN 7-FOOT HOLES.

RESULTING CRATER APPROX. 8-FEET DEEP AND 25-FEET WIDE.



HASTY ROAD CRATER



HOLES OF EQUAL DEPTH, (2½ FEET TO 5 FEET) SPACED AT 5-FOOT INTERVALS.

USE 10-POUNDS OF EXPLOSIVES PER FOOT OF DEPTH.

RESULTING CRATER DEPTH APPROX. 1½ TIMES DEPTH OF BORE-HOLES.

WIDTH APPROX. 5 TIMES DEPTH OF BORE-HOLES.

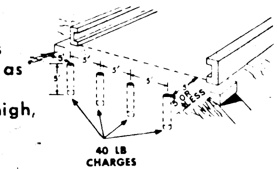
BRIDGE ABUTMENT DESTRUCTION

ABUTMENTS 5 FEET OR LESS IN THICKNESS

Beginning 5 feet in from one side of road, place 40 lb. cratering charges in holes 5 feet deep, 5 feet on centers and 5 feet behind river face of the abutment.

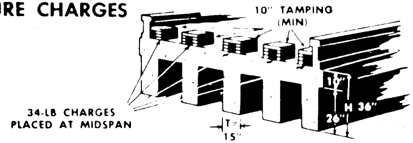
ABUTMENTS MORE THAN 5 FEET IN THICKNESS

Calculate charges by breaching formula and place against rear face at a depth equal to thickness of abutment and space the same as other breaching charges.
(When abutment is over 20 feet high, add a row of breaching charges on the river face at the base of the abutment and fire all charges simultaneously)



PRESSURE CHARGES

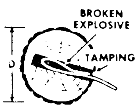
POUNDS = $3H^2T$



POUNDS OF TNT FOR EACH BEAM (TAMPED CHARGES)									
HEIGHT OF BEAM IN FEET	THICKNESS OF BEAM IN FEET								
	1 12 IN	1¼ 15 IN	1½ 18 IN	1¾ 21 IN	2 24 IN	2¼ 27 IN	2½ 30 IN	2¾ 33 IN	3 36 IN
1 (12 IN)	3								
1¼ (15 IN)	5	6							
1½ (18 IN)	7	9	11						
1¾ (21 IN)	10	12	14	16					
2 (24 IN)	12	15	18	21	24				
2¼ (27 IN)	16	19	23	27	31	35			
2½ (30 IN)	19	24	29	33	38	43	47		
2¾ (33 IN)	23	29	34	40	46	51	57	63	
3 (36 IN)	27	34	41	48	54	61	68	75	81
3¼ (39 IN)	32	40	48	56	64	72	80	88	95
3½ (42 IN)	37	46	56	65	74	83	92	101	111
3¾ (45 IN)	43	53	64	74	85	95	106	116	127
4 (48 IN)	48	60	72	84	96	108	120	132	144
4¼ (51 IN)	55	68	82	95	109	122	136	149	163
4½ (54 IN)	61	76	92	107	122	137	152	167	183
4¾ (57 IN)	68	85	102	119	136	153	170	187	203
5 (60 IN)	75	94	113	132	150	169	188	207	225

TIMBER CUTTING CHARGES

INTERNAL CHARGES



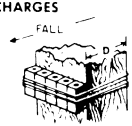
POUNDS = $\frac{D^2}{250}$

WHERE D IS THE LEAST DIMENSION IN INCHES

EXTERNAL CHARGES

POUNDS = $\frac{D^2}{40}$

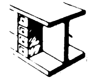
WHERE D IS THE LEAST DIMENSION IN INCHES



TYPE OF CHARGE	EXPLO-SIVE	CHARGE UNIT	LEAST DIMENSION OF TIMBER IN INCHES									
			6	8	10	12	15	18	21	24	30	36
			BLOCK OR POUNDS OF EXPLOSIVES									
INTERNAL	ANY	LB.	½	½	½	1	1	1½	2	2½	4	6
EXTERNAL	TNT	LB.	1	2	2½	4	6	9	11	15	23	33

STEEL CUTTING CHARGES

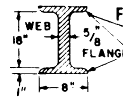
COMMON STEEL MEMBERS



POUNDS (EXPLOSIVE)= 3/8 × AREA OF CROSS SECTION IN SQ. IN.

'Calculate rectangular areas and add, to obtain total area).

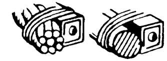
EXAMPLE PROBLEM



FLANGES: WIDTH= 8 IN.
THICKNESS= 1 IN.
FROM TABLE, CHARGE= 3.0
WEB: WIDTH= 18 IN.
THICKNESS= 5/8 IN.
FROM TABLE, CHARGE= 4.3

CHARGE: 2 FLANGES= 2×3.0= 6.0
WEB= 1×4.3 = 4.3
TOTAL 10.3
(USE 11 POUNDS EXPLOSIVES)

CABLES, RODS AND BARS



POUNDS (TNT) = diameter ^{2}
($P = D^2$) in inches
when diameter equals 2" or less (when more use P = 3/8A)

FOR SQUARE BARS
POUNDS= AREA OF CROSS–SECTION IN SQUARE INCHES WHEN DIAMETER OR DIMENSION IN CONTACT WITH EXPLOSIVE EQUALS 2 INCHES OR LESS
(When more, use P= 3/8 AREA)

Average Thickness of Section in Inches	POUNDS OF TNT FOR RECTANGULAR STEEL SECTIONS OF GIVEN DIMENSIONS											
	WIDTH OF SECTION IN INCHES											
	2	3	4	5	6	8	10	12	14	16	18	20	24
1/4	.2	.3	.4	.5	.6	.8	1.0	1.2	1.3	1.5	1.7	1.9	2.3
3/8	.3	.5	.6	.7	.9	1.2	1.4	1.7	2.0	2.3	2.6	2.8	3.4
1/2	.4	.6	.8	1.0	1.2	1.5	1.9	2.3	2.7	3.0	3.4	3.8	4.5
5/8	.5	.7	1.0	1.2	1.4	1.9	2.4	2.9	3.3	3.8	4.3	4.7	5.7
3/4	.6	.9	1.2	1.4	1.7	2.3	2.8	3.4	4.0	4.5	5.1	5.7	6.8
7/8	.7	1.0	1.4	1.7	2.0	2.7	3.3	4.0	4.6	5.3	6.0	6.6	7.9
1	.8	1.2	1.5	1.9	2.3	3.0	3.8	4.5	5.3	6.0	6.8	7.5	9.0

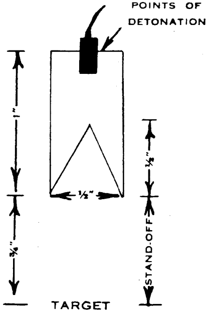
TO USE TABLE:

1. Measure rectangular sections of member separately
2. Using table, find charge for each section.
3. Add charges for sections to find total charge.
4. Never use less than calculated charge.

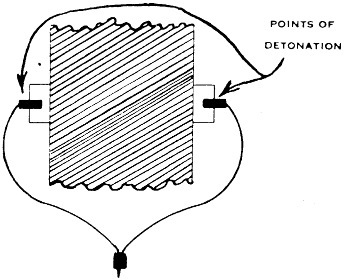
ADVANCED TECHNIQUE RULES OF THUMB

Improvised shape charge (Munroe).

1. Stand-Off - 1 1/2 times diameter of cone
2. Size - 2 times height of cone
3. Angle - 45 to 60 degrees
4. Detonation - exact rear center of charge



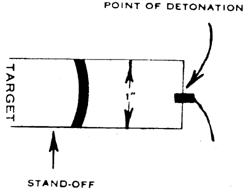
COUNTER FORCE



Counter force

1. Size - 1 to 1 1/2 lbs per foot of concrete
2 Placement - both charges exactly opposite each other and flush with target.
3. Detonation - simultaneous detonation in exact rear center of each charge

PLATTER CHARGE



Platter charge

1. Size - approximately 1/2 lb per inch of platter
2. Stand-off - approx equal to size of platter
3. Detonation - exact rear center of charge

U.K. CIVIL DEFENCE ASSOCIATION, "ALERT", No. 58, SEPT. '63.

FALLOUT IN FOOD

AFTER the explosion of a nuclear weapon there is a radioactive debris known as fallout, radiation from which can damage the living tissue.

The subject is controversial for two reasons. First, although we know for certain some of the effects of large doses of radiation, we know very little about the effects of continued small doses which is what we have as the result of nuclear testing. And, secondly, there is no agreement as to whether or not there are benefits which justify adding to the dose of radiation the human body already receives from other sources.

In the circumstances, we have decided to give here a summary of facts about radioactive substances in food, and the way in which the Agricultural Research Council (ARC) measures the changing amounts found in our diets as a result of nuclear tests. We hope that it will be of some guidance to members who consider the amount of radioactive substance in their food a matter for consumer interest.

The effects of radiation

The human body has always been exposed to radiation from natural sources—such as radioactivity in rocks and food, and cosmic rays—but, recently, man-made radiation has been added to the total to which we are exposed. This man-made radiation includes, among other things, radiation from the fallout of nuclear explosions.

Radiation in large doses, we know, can cause damage to living tissue. But our knowledge of small doses spread over a long period of time—which is what we get from fallout—is still limited.

For this reason, recent reports of the United Nations Scientific Committee and the Medical Research Council (MRC) on the effects of radiation both consider it prudent to assume that even the smallest doses may cause some harm, in a small number of people, in large populations. The smaller the dose, the smaller the number of people who may be affected.

The possible effects of radiation are of two kinds. When it is absorbed through the reproductive cells it can cause changes leading to hereditary diseases in *future generations*. When it is absorbed by other parts of the body any damage it can cause is to the *individual*. These effects—both on future generations and on individuals—can, of course, arise from other causes.

How radiation enters the body

Much the greater part of the dose from natural radiation penetrates the body from the outside. From fallout, however, much the greater part of the dose comes from the radioactive elements—strontium 90, caesium 137, iodine 131 and carbon 14—taken into the body in food.

Strontium 90 is chemically like calcium, so when eaten, it concentrates in newly formed bone, for example, the growing bones of children. The amount depends on its ratio to calcium in the total diet, as calcium dilutes the strontium 90. Once built into bone structure strontium 90, like calcium, remains there and irradiates the bone for many years. Because strontium 90 concentrates in the bone, the effect of its radiation is on the bone and bone marrow. This means that there is a possibility of an increase in the normal incidence of bone cancer and leukaemia.

Caesium 137 becomes widely distributed throughout the body, but only stays in it for a few months.

Carbon 14, which occurs naturally as well, also becomes widely distributed throughout the body. The radiation received from it in fallout each year is very much smaller than that from caesium 137, but it will continue to be a radiation hazard for thousands of years, because it takes 5,800 years for its intensity to fall to half.

Radiation from caesium 137 and carbon 14 (and, to a lesser extent, from strontium 90) may affect the reproductive cells, and hence increase the possibility of hereditary diseases. It may also affect the bone and bone marrow.

Iodine 131 concentrates in the thyroid gland, but its intensity quickly falls off. Very large doses of radiation have been shown to cause thyroid cancer, so it is possible that small doses might have the same effect. Iodine 131 concentration is greater in the smaller gland of babies.

Background radiation

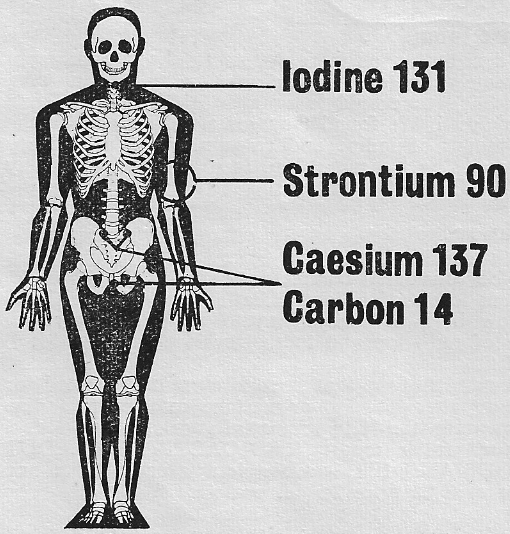
In considering the potential hazard from fallout, it should be seen in relation to the radiation man has always received from natural sources. The world average dose from the latter is about 120 - 130 millirems a year (a millirem is a measure of the effective radiation absorbed by living tissues). In addition, in this country, there is an average of about 20 milli-rems from medical radiology. During the five years 1955 to 1959, the average dose from fallout which could give rise to *genetic* effects was only about 2½ milli-rems a year. The tissues of *individuals* which received the highest doses in 1955-59 were new bone—about 10 milli-rems a year—and bone marrow—about 6 milli-rems a year; in 1961, the thyroid glands of some groups of babies received about the same amount as that from natural sources.

Radiation in Food

The International Commission on Radiological Protection has set maximum permissible levels for those exposed to occupational radiation hazards. For the population as a whole, one-thirtieth of these levels is recommended as a maximum.

For iodine 131, the MRC has specified a level of 130 pico-curies (a measure of intensity of radioactivity present) per litre of milk, averaged over the year, as being acceptable for any age group.

The radiation from strontium 90 in diet is assessed in terms of a 'working level', derived from recommendations of the MRC. This level, which incorporates an additional safety factor of two, is 130 pico-curies of strontium 90 per gram of calcium as an annual average for the population as a whole.



This level corresponds to a dose to a new bone of 90 milli-rems per year, which is similar to the natural background radiation in the U.K. (about 100 milli-rems).

It is considered that intakes at these levels are **BELOW** those which could cause an appreciable, detectable increase in the number of cases of cancer of the thyroid, leukaemia or bone cancer, in the population as a whole. It is not proposed to put any public health measures into operation while the amount present remains below these levels.

The monitoring of radioactivity in diet in the U.K. in relation to these levels is carried out by the Radiobiologcal Laboratory of the ARC.

— Caesium 137 and Carbon 14

Comparatively few measurements of caesium 137 in food are required as radiation from it can be directly measured in the human body. Radiation from carbon 14 can be directly inferred from the amount in the air.

The main hazard of these radioactive elements is a genetic one. No levels for these elements in diet have yet been set.

— Iodine 131

Iodine 131 mainly enters the diet in milk. The ARC measures the radiation from iodine 131 in samples of milk from a large number of depots all over the country at frequent intervals. Because the intensity of its radiation falls to half in as little as eight days, it is only found shortly after weapon testing.

Average countrywide figures of iodine 131 for 1961 and 1962 were:

YEAR	*Period present*	*Percentage of MRC level average over the year*
1961	*September — December*	*17*
1962	*August — December*	*15*

We understand that no appreciable amounts of iodine 131 have been found in milk during the first few months of 1963.

— Strontium 90

As strontium 90 is chemically similar to calcium the amount absorbed by bones is directly related to the proportion between strontium 90 and calcium in the diet.

The amount in the complete diet can only be worked out over a whole year as some crops are seasonal. A good indicator of the level at any time is, however, given by that in milk, since it has a strontium 90 to calcium ratio similar to that of the whole milk diet. Measurement of the amount in milk takes four to six weeks. Earlier indications are given from measurements of strontium 90 in air and rain.

The ARC survey covers milk collected every fortnight from 200 depots throughout the country, and imported cheese, root crops, green vegetables, cereal grain both home grown and imported, eggs and tea. Values for meat and fish need only be deduced as they contribute little calcium and strontium 90.

Countrywide average figures from fallout for the complete diet for the years 1958 to 1961 were as follows:

	1958	1959	1960	1961
Pico-curies of strontium 90 per gram of calcium	***5.9***	***9.0***	***6.4***	***6.2***

In some major regions of the country, where the rainfall is higher, the amounts were about half as much again.

It will be seen that these amounts are small compared with the 'working level' of 130 pico-curies of strontium 90 per gram of calcium in the diet.

Figures for the complete diet for 1962 are not yet available, but a good indication is given by the figure of 9.6 pico-curies of strontium 90 per grain of calcium for milk in the 12 months up to 30th September ,1962. This is slightly lower than the previous highest figure, in the year ending 30th September, 1959.

Changes of diet

Although milk contributes a large proportion of strontium 90 to the diet, variation in the amount of milk drunk has little effect on the intake, since the ratio of strontium 90 to calcium in milk is nearly the same as for the total diet.

Entirely abnormal changes in consumption of other foods would be needed to alter the ratio appreciably for the complete diet.

Publication of figures

Figures for radioactivity in food are published by the Agricultural Research Council in their annual Report issued each year around September. Interim reports and press statements are issued whenever it is considered necessary. In the autumn of 1961, during the period of considerable fallout of iodine 131, the ARC issued weekly figures to the press.

Figures for radioactivity in air and rain are published by the U.K. Atomic Energy Authority, and in drinking water by the Ministry of Housing and Local Government.

The Medical Research Council publishes reports on the levels of strontium 90 in bone. All these reports are available from H.M. Stationery Office and are usually commented on in the press, but often only briefly.

Anti-fallout sweets

There has recently been publicity for a product known as Ashodine anti-fallout sweets which claim to protect people from the effects of radioactive fallout. In particular, it has been reported that they reduce the intake of radiation due to strontium 90 and iodine 131.

Theoretically, the maximum effect of doubling the total calcium in the diet would be to halve the strontium 90/calcium ratio. But many experiments indicate that the actual effect may well be much less than this.

There is considerable evidence that additional stable iodine in the diet, in a single dose of about 100 milligrams (about 1,000 times the normal intake daily) can block the uptake of radioactive iodine 131 into the thyroid gland, if taken during periods when iodine 131 from fallout is present in milk. A much more satisfactory way of reducing that dose for young children, nursing and pregnant women during periods of high fallout, is for them to use dried or tinned milk instead of fresh.

(Continued on page 4)

EXAMINATION FOR CIVIL DEFENCE OFFICERS

At last someone has thought of providing a scheme of examination for Civil Defence Officers with a view to providing adequate means of testing fully the professional knowledge of Local Authority Civil Defence Officers or prospective officers.

The scheme has been inaugurated by the Association of Civil Defence Officers who have published a syllabus covering the orders of membership, i.e. Licentiates, Associates and Fellows.

The scheme is to be brought in to force as from 1st September, 1963, and from 1st January, 1967, admission to membership of the Association will be restricted to those who have passed the Association's examinations and who also satisfy all the other conditions contained in the Rules of the Association.

The period of studentship registration is five years from the date of admission, and candidates are normally expected to complete their examination within this period; an extension of time may, however, be granted by the Council at its discretion.

Registration confers no rank of membership but candidates are entitled to receive copies of the journal of the Association. A registration fee of £2 2s. is payable at the time of application.

It will be the responsibility of students to make their own arrangements in respect of tuition. The Hon. Examination Secretary will be prepared to advise Registered Students of the facilities which are available throughout the country.

Further information can be obtained from the Regional Representatives of the Association, or the Hon. Gen. Secretary, Mr. F. Raine-Allen, M.B.E., D.P.A., 55 Murray Road, Northwood, Middlesex, or from the Hon. Examination Secretary, Mr. W. T. Longley, A.C.I.S., 13 Fernhall Gardens, Kingston-upon-Thames.

FALLOUT:

What we found

The distribution of these sweets to shops appears to be extremely limited. We did manage to obtain some sweets which were sold to us as ASHODINE and had them analysed. We found they contained only about the same amount of iodine and calcium as some ordinary sweets made by the same firm. Further attempts to buy ASHODINE sweets were unsuccessful.

Conclusions

Strictly speaking, even the lowest levels of radiation cannot be considered completely harmless.

Current levels of fallout radiation in food are, however, low both in comparison to natural background sources of radiation and to the levels set by the MRC and ARC.

It seems, therefore, that there is currently no need for anyone to alter his diet or to take calcium or iodine supplements in the form of special sweets.

A much fuller report, RADIOACTIVE FALLOUT AND HUMAN DIET, is available as a pamphlet to any member of CA., price 2s. 6d. post free.

Editor's Note: This article has been reprinted from Which? *1963.* Which? *is published by the Consumers' Association and is obtainable on annual subscription of £1 for 12 monthly issues from 14 Buckingham Street, London, WC2.*

THE COUNTY OF LONDON C.D. COMPETITION FINALS

The County Finals of the Ambulance and First-Aid, Welfare and Rescue Competitions were held at Bully Fen, Hackney, on 29th June. The finalists were the survivors of 45 teams originally entered and the results were:

Ambulance and First Aid

Winners: Area 51D (Bethnal Green, Hackney, Stepney and Poplar)
Runners up: Area 53A (Camberwell, Lambeth and Southwark)

Rescue

Winners: Greenwich
Runners up: London Transport Board 'E' (Lillie Bridge Depot I.C.D. team)

Welfare

Winners: 1 — Lewisham
2 — Woolwich
3 — Bermondsey

The Chairman of the London County Council (Mr. A. Reginald Stamp, J.P.) presided over the Competitions and introduced the guest of honour, the Earl Jellicoe, D.S.O., M.C., Minister of State, Home Office.

In presenting the prizes, the Earl Jellicoe spoke appreciatively of the work done in Civil Defence, which reflected a voluntary but very worth-while surrender of volunteers' time and leisure. He stressed the continuing need and justification for Civil Defence. Until the Government's efforts, which were directed at the lessening of international tension, met with success Civil Defence was an essential part of the nation's security measures.

Should their efforts for peace fail the future would depend on the Civil Defence training and planning that could be, and was being done now.

HOME OFFICE
SCOTTISH HOME DEPARTMENT

Civil Defence Instructors' Notes

WARDEN SECTION

Functional and Supplementary Notes

LONDON
HER MAJESTY'S STATIONERY OFFICE
1960
PRICE 8s. 6d. NET

THE WORK OF THE WARDEN IN PEACETIME

The Warden War Book

19 The functions of a warden can only be carried out effectively if much preparatory work has been done in peacetime, but some of it cannot be undertaken until the government of the day directs it to be done. All information regarding the post area should be acquired systematically and recorded in a "Warden War Book", which is simply a name for a book containing information, lists, etc., valuable in wartime. The book would contain:

(*a*) A household register, giving the numbers of persons in each household in the area, together with particulars of handicapped persons, children and others in the priority classes for evacuation purposes, car-owners, etc.

(*b*) Names, addresses and telephone numbers of local officials, doctors, nurses, street leaders, etc.

(*c*) Notes of important buildings, factories, public utilities and other services, possible places for use as fall-out refuges, installations having special fire risks or other hazards, buildings which might be used as emergency rest or feeding centres, etc.

(*d*) Details of a scheme for posting fall-out warning notices and clearance of the area should it be in a highly radioactive zone. (The words "radioactive belt" are used in Scotland to avoid confusion with operational zones.)

(*e*) Details of a scheme for passing information to the public quickly, and especially in conditions of fall-out, for either clearance or release purposes.

(*f*) A scheme for organising self-help or stretcher bearers through street leaders.

Knowledge of Post/Patrol Area

20 Although information is recorded in the War Book, and on maps of the post area, and elsewhere, all wardens should have an intimate *personal* knowledge of the area. Conditions will vary somewhat, particularly in rural areas, but, as a general guide, wardens should know:

(*a*) The boundaries of the post areas and the patrol areas, and, where the post area boundary is also the sector boundary, the designation and location of the adjoining warden posts.

(*b*) The location of the Sector Post to which the warden post reports.

(*c*) The location of warden posts in his own Sector area.

(*d*) The nearest "home cover" fire and ambulance stations*.

(*e*) The nearest police station(s).

(*f*) The location of "first line" rest centres*, and buildings suitable for use as emergency rest or reception centres; and, similarly, of emergency feeding centres.

(*g*) High fire risks (e.g. petrol stores).

(*h*) Points of special operational significance (e.g. bridges, aqueducts, over-ground mains).

(*j*) Addresses of other wardens and members of the civil defence services in any particular patrol area (Senior Wardens and wardens).

(*k*) Nature of important industrial undertakings, and the operational arrangements between such undertakings and the Civil Defence Corps.

(*l*) The location of public shelters (if any) and how to obtain access to them.

PRACTICAL LESSON IN USE OF LIGHTWEIGHT RADIAC SURVEY METER

Notes for Instructor

1 The instructor should have, when available, a lightweight Radiac Survey Meter (0–100 r.p.h. scale). Until supplies of the operational instrument are available for training, the instructor will only be able to show a "mock-up" meter, but this can be roughly representative of the actual meter in size and has the correctly scaled dial reading from 0–100 r.p.h., although it has no switches or self-contained batteries, and it will be lighter in weight than the operational instrument. The "mock-up" meters from a locally constructed Battery Operated Radiac Trainer can be used, together with one or more complete trainer sets (instructor's control panel, five "mock-up" meters and wiring). The instructor should also put up on a blackboard or have available on a chart a series of typical dose-rate readings, building up to a fall-out maximum, levelling off, and then falling. He should also explain the logarithmic scale diagrammatically.

2 The class should be practised in taking and logging readings simulated on the five meters of the trainer, and in determining fall-out arrival (FOA) and fall-out maximum (FOM), using various protective factors (PF) to relate internal readings in a building to external dose-rates. The PF is the fractional difference between an external and internal dose-rate reading, e.g. if the reading outside were 10 r.p.h. and the reading inside were 2 r.p.h., the inside reading is 1/5th of that outside—a factor of 5.

Object of Lesson

3 To describe and teach the use of the lightweight Radiac Survey Meter and how to take and record radioactivity readings.

Description of the Lightweight Radiac Survey Meter (Operational)

4 The meter is a self-contained battery-operated instrument which is easy to carry and simple to use. It weighs only 2½ lbs. When switched on it detects the presence of fall-out and measures the rate at which radiation from fall-out is being received (i.e. the dose-rate) by means of a pointer moving across a scale reading from 0–100 r.p.h.

5 The instrument has two simple controls which are on the top panel and can be turned by hand. They are an ON/OFF switch, and a spring-loaded CHECK FULL SCALE switch to enable the user to check that the calibration is accurate. The instrument is normally self-calibrating and needs no re-setting for very long periods, but, if necessary, two simple pre-set screw adjustments can be made even in the presence of radioactivity up to a dose-rate of 100 r.p.h.

6 The dial scale is different from that of some instruments. The spaces between the readings are progressively less as the readings increase. It is easy to read provided it is remembered that each of the marks on the scale represents an increase of ·1 from 0–1, 1 from 1–10, and 10 from 10–100. The advantage of this kind of scale—called logarithmic—is that it enables accurate readings to be taken at the lower end of the scale, and at the same time to register high readings at the upper end. (See Appendix A.)

Taking Readings with the Meter (Explanation and Demonstration)

7 Wardens equipped with the meter are required to detect the arrival of fall-out (FOA) (see W 36). After a fall-out warning (or hearing, or seeing the flash of, a nuclear explosion)

Sector, Post and Senior Wardens should watch their meters in the open at five-minute intervals in order to detect FOA. (Fall out Arrival = FOA.)

8 When fall-out arrives, Sector and Post Wardens will record the time of the fall-out arrival and they will then take and record readings every five minutes. They will continue to take external readings until the dose-rate reaches 3 r.p.h., at which they will retire inside the post to a spot where the instrument reads 0·3 r.p.h. (1/10th of the external dose-rate). They will then leave the meter switched on at that spot and go further inside the post to seek the best possible protection—returning to the spot every 10 minutes to take a reading. The time, the actual instrument reading, and the estimated external dose-rate should be recorded, e.g. 1010 hours; (1·5 r.p.h.): 15 r.p.h. (The instructor should emphasise that *reports* are always made in terms of the *external* dose-rate.)

9 If, however, the internal reading at this spot goes up to 3 r.p.h. (i.e. indicating an external dose-rate of 30 r.p.h.), the meter should be moved to a second spot where the reading goes down to 0·3 r.p.h., or the nearest approach to that figure. The ratio between the reading at the second spot and 30—providing no time is lost between taking the reading at the first spot and the reading at the second—will indicate the PF for this second spot. For example:

(*a*) if the reading at the second spot is 0·3 r.p.h., then the PF there is 100;

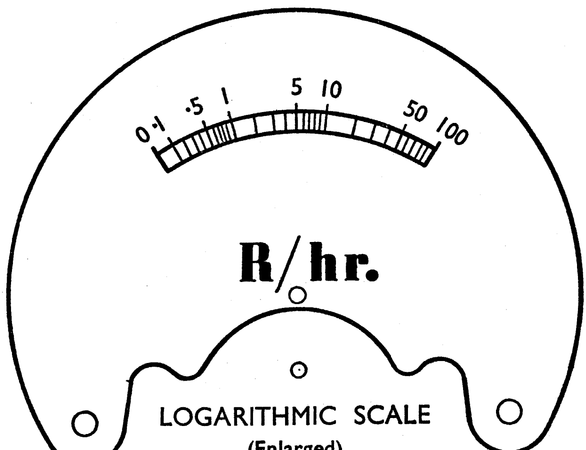
(*b*) if the reading at the second spot is 0·5 r.p.h., then the PF there is 60;

(*c*) if the reading at the second spot is 1 r.p.h., then the PF there is 30.

Any reading taken at the second spot will have to be converted to the external dose-rate by multiplying it by the appropriate PF.

APPENDIX A

DIAGRAM OF LOGARITHMIC SCALE USED ON LIGHTWEIGHT RADIAC SURVEY METER



ESCAPE AND RESCUE FROM BURNING BUILDINGS

Notes for Instructor

1 Reference: Civil Defence Handbook No. 4, Elementary Fire Fighting.

2 Instructor requires:
- (*a*) Room with clear floor area on which to demonstrate and practise search of room, protection, if trapped, moving helpless person on level surface and dealing with a person on fire.
- (*b*) Suitable staircase to show and practise method of getting helpless person down it.
- (*c*) Low first floor window or wall to show method of escape.
- (*d*) Two helpers for demonstrating.

3 Period to be conducted as series of demonstrations with commentary, each demonstration being followed by practice by the class.

Object of Demonstration and Practice

4 To demonstrate how best, under fire conditions in a building, to find protection if trapped, to escape, to search for and rescue others from it, and to practise class in these methods.

Personal Protection

5 Two elementary principles. Wet cloth or handkerchief placed over mouth and nose gives some protection against smoke. If lost in room make for wall and continue round it in same direction till door or exit reached.

Escape

6 Air clearest and coolest near floor. Crawl with free hand raised in front to feel for obstructions. When using stairs keep close to wall, go down backwards feeling with foot for each step. Often possible to escape by dropping from a window on to the roof of an outbuilding, such as a wash-house or projecting kitchen, and so reaching the ground. Make certain that a "drop" can be made with safety—that something in the nature of a glasshouse or a railway line or cutting is not immediately below. If dropping from window, grip sill and lower self to full extent of arms, then let go and drop.

Rescue

7 It is advisable to work in pairs on entering smoke-filled room; make complete circuit of room, keeping close to wall, feeling under and on beds and inside cupboards; finally cross room diagonally to ascertain if anyone lying in centre. To move an insensible person, turn him on his back and tie his wrists together, kneel across him and place your head through loop formed by his arms; then crawl, dragging him with you. To move an insensible person downstairs, lay him on his back, head downwards on the stairs, place your hands under his armpits so that his head rests on the crook of your arm, then ease him gently downstairs.

8 *Clothing on Fire:* If another person's clothing is on fire, muffle in coat, blanket, curtain, etc., get on ground and roll over and over. Do not allow to remain upright, as flames lick upwards and produce serious burns of face and breathing passages. Do not hesitate to trip him up if he starts to run. If own clothing on fire clap hand over mouth, lie down and roll, using, if available, a mat, rug or carpet to roll up in.

Class Practice

9 On conclusion of each part of demonstration, the class, where necessary divided into pairs, practise the methods taught, instructor supervising.

Concluding Summary

10 The object has been to give practical instruction in the best methods under fire conditions of searching a building, taking protection if trapped, and escaping and rescuing others.

OTHER TYPES OF RESPIRATOR*

Notes for Instructor

1 Reference: Civil Defence Manual of Basic Training, Volume II, Pamphlet No. 1, "Chemical Warfare", Chapter IV and Appendix B.

2 The instructor requires:

(*a*) Chart giving list of respirators.
(*b*) One General Civilian respirator new design (C7) for instructor and one per individual.
(*c*) One sizing cone for instructor and one per individual.
(*d*) One Small Child's respirator (C2).
(*e*) One Baby Helmet respirator (C3).
(*f*) One Helmet respirator (C4).
(*g*) One Hospital respirator (C5).

NOTE: C1 = OLD 1937 - WW2 TYPE!

Object of Lesson

3 To demonstrate and describe types of respirator other than Civilian Duty respirator, and to explain variations in fitting procedure.

CIVILIAN RESPIRATORS:- C7, C2, C3, C4, C5:

Description of Various Types

4 *General Civilian Respirator, New Design (C7)*: Has rubber sheet facepiece with two eyepieces of non-inflammable transparent material. An outlet valve with a dome-shaped cover is fitted on the left side. On the inside, running completely round the fitting surface, is a rubber tube containing air at atmospheric pressure; this is known as the fitting tube. Five sizes. Held in position by four adjustable tapes. Container secured by a strong rubber band. For fitting procedure and use of sizing cones see G 17(A), Appendix A.

5 *Small Child's Respirator (C2)*: Has moulded rubber facepiece with container attached by screw joint. Two eyepieces and outlet valve. Head-harness of coiled springs enclosed in braid. Security device to prevent child removing facepiece. For children between 18 months and four to four and a half years.

6 *Baby Helmet Respirator (C3)*: Is a hood of impervious fabric with large window, which encloses head, shoulders and arms. Closed round waist by draw tape. Supported on adjustable light metal frame. Air supply by bellows device.

7 *Helmet Respirator (C4)*: Is loosely fitting hood of rubberised fabric secured under armpits. Two eyepieces. Air supply through container by means of bellows. Intended for persons suffering severe respiratory disabilities.

8 *Hospital Respirator (C5)*: Is hood of impervious fabric with large window and skirt designed to lie on chest under bedclothes. Air supply by bellows device as for helmet respirator.

Concluding Summary

9 The object has been to demonstrate and describe types of respirator other than Civilian Duty respirator and to explain variations in fitting procedure.

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* For Civilian Duty respirators see G. 17 (A), paragraph 24.

*Control of the Public in Radioactive Zones**

Notes for the Instructor

1 Reference: Manual of Civil Defence, Volume I, Pamphlet No. 2, "Radioactive Fall-out Provisional Scheme of Public Control", and Pamphlet No. 1, "Nuclear Weapons" (Second Edition, 1959).

2 The instructor should have a chart or blackboard drawing of a typical fall-out plume available, marked with the boundaries of W, X, Y and Z Zones. The colours used for zone boundaries should be:

(*a*) Zone W black.
(*b*) Zone X brown. = BELOW 1000 R/hr at 1 hour after fission.
(*c*) Zone Y green.
(*d*) Zone Z red. = 1000 R/hr at 1 hour or 10 R/hr at 48 hrs

3 He should also have a small scale map on which to indicate geographically how clearance of a Z Zone is effected (see Part III).

Object of the Lecture and Demonstration

4 The object is to explain the principles of public control in radioactive zones, and the procedure to be adopted in release and clearance of the public.

I—PRINCIPLES OF THE SCHEME

Fall-out Refuge—Requirements

5 Some protection against fall-out can be provided in normal dwelling houses, particularly if they are in a built-up area. Provided the windows are blocked with sandbags, or an equivalent, a ground floor room in a two-storey terrace house or a semi-detached house with walls of 13½ inches brick work, should give a protective factor (P.F.) of 40 against fall-out, i.e. the dose inside would be only one-fortieth of that in the open air. (See "Nuclear Weapons", paragraphs 9.21–9.23.) Larger buildings, and those with more substantial walls and floors (e.g. blocks of flats, factories, multi-storeyed tenements, etc.) will have a higher P.F., whereas isolated houses, small single-storeyed buildings, bungalows, etc., will have lower P.F's. Basements and cellars, where the radiation from fall-out outside the house has additionally to pass through considerable thicknesses of earth, have P.F's upwards of 200. Similarly, slit trenches covered with 2 or 3 feet of earth can have P.F's of more than 200.

For the purpose of control and safety, time spent in places with a minimum P.F. of 40 is referred to as "in refuge", and time spent elsewhere in a house or other place where there is a P.F. of not less than 10, is described as "under cover".

16 In a Z Zone the intensity of radioactivity (10 r.p.h. or more at H + 48) is such that the population can neither remain in it permanently, nor be cleared from it while the intensity is so great that it would be more dangerous to be in the open than to stay in refuge for a time. At some point in time subsequent to H + 48 everyone will have to be cleared from a Z Zone. The time at which clearance is to take place will have to be decided at Sub-region or Group, or even Regional (Zone control: Scotland) level, and the clearance effected by arrangements made at that level.

GEIGER CONTAMINATION MONITOR?

15 *Purpose:* Main purpose is to detect and measure contamination due to radioactive fall-out which may be present on clothes or skin, particularly of casualties before hospital treatment. By interchanging probes, meter can be used for other purposes such as measuring radioactivity in water. Operationally, the probe can be fitted with a transparent plastic sheath where necessary, to protect it from contamination by radioactive material.

Radioactive Sources for Training

16 Radiac instruments referred to above will be used in conjunction with the following types of radioactive sources:

(*a*) Source, Radioactive, Type A—for testing dosimeters, training survey meter and contamination meter.

(*b*) Source, Radioactive, Type B—for use with contamination meter.

(*c*) Source, Radioactive, Type C—for use with training dosimeter and training survey meter.

(*d*) Source, Radioactive, Type D—for use with training survey meter out of doors.

(*e*) Source, Radioactive, Type G—for use in calibrating operational survey meters No. 1 and No. 2.

17 Containers for radioactive sources are designed to minimise risk during transport and storage of sources. They are coloured bright orange and lettered to denote type of source. Containers consist of three parts: (with the exception of Type G, in which the jig forms its own container):

(*a*) The source itself—a red painted capsule sealing in the active material at one end of a carrying rod. (*Note:* with type D source an extension piece is provided to lengthen the rod; but with type B, five disc shape capsules are loose, inside a carrying rod—they must be removed for use and may safely be handled.)

(*b*) Shield of lead to attenuate radiation from sources when not in use (types C, D and G only).

(*c*) Outer metal container.

Type A Radioactive Source

18 Small source of radium, for testing and checking training instruments. Will produce dose-rate of 0·5 milliroentgens per hour at one yard.

19 To make a correct check reading of the training type of individual dosimeter it is necessary to ensure that the ionisation chamber of the instrument is 3 inches from the type A source. If the dosimeters are set up on end, with the eye-piece upwards, against the inside of the rim of the standard container of the source, they will form a circle with a radius of 3 inches from the centre. The source itself, on its carrying rod, should then be mounted in its normal hole upside down, i.e. with the rod in the hole, red end upwards, with a rubber ring fitted around the rod, so as to leave the source and approximately 2 inches of the rod protruding from the hole. It will then be at the correct height to radiate direct into the ionisation chambers of the surrounding dosimeters.

20 *Testing training radiac survey meter:* To check training type radiac survey meter, place meter two yards from type A source. Immediate reading at this distance when meter switched on, should be about 125 microroentgens per hour.

21 *Testing contamination meter:* with contamination meter, if Type A source placed 13 inches from Geiger counter probe about 4 milliroentgens (i.e. 4,000 microroentgens) per hour should be recorded.

Type B Radioactive Source

22 Small source of radiocobalt for demonstration of detecting radioactive contamination using contamination meter. Intended to be hidden in personal clothing. Will produce dose-rate of about 0·16 milliroentgens (i.e. 160 microroentgens) per hour at one yard. Five of these small button-like sources are held in one container.

Type C Radioactive Source

23 Small source of radiocobalt for classroom use. One source placed a few inches from individual dosimeter of training type will produce half-scale deflection in one hour. With training type radiac survey meter, full-scale deflection produced at distance of between two and three yards. Will produce dose-rate of about 1·6 milliroentgens (i.e. 1,600 microroentgens) per hour at one yard.

Type D Radioactive Source

24 Medium source of radiocobalt intended primarily for outdoor demonstrations and exercises with training type radiac survey meter. Four such sources, suitably arranged at ten yard intervals, adequate for outdoor demonstration or exercise with radiac survey meter over walk of about 70 yards (see Appendix A). Will produce dose-rate of 7·8 milliroentgens (i.e. 7,800 microroentgens) per hour at one yard.

Type G Radioactive Source

25 Medium source of radiocobalt for use in calibrating operational survey meters No. 1 and No. 2. This source is held in a spherical lead shield jig which separates into two portions for use in accordance with the instructions given on a plate attached to the jig.

Hazards

26 Above sources give off gamma rays continuously. These rays even more penetrating than X-rays, but (as with X-rays) their effect is reduced by distance and shielding. Gamma rays harmful to living matter. Cannot be detected by ordinary senses and radiac instruments must therefore be used. Rays are injurious if they enter human body in excessive quantities, but small daily doses can be tolerated by normal person without harm. For scientific workers and others who are in daily contact with radioactivity this maximum daily tolerance dose is 0·1 roentgens (100 milliroentgens) per day or 0·3 roentgens (300 milliroentgens) per week and this is used for purpose of civil defence training. Much larger occasional doses would be accepted in war, however, especially as such doses would not necessarily be repeated daily but only when urgent needs dictated.

27 In ordinary training, size of sources are such that with suitable precautions the doses received will be harmless whilst still giving readable deflections on training meters; but it is essential to limit exposure by:

(*a*) Good discipline.

(*b*) Simple, unambiguous orders which are easy to remember.

(*c*) Reliable individual dosimeters (Trainer No. 1) which are well maintained and checked frequently against standard sources.

28 Since sources used for training are all in a sealed capsule or jig there is no need for protection against radioactive dust. No special protective measures need, therefore, be taken, other than mentioned below.

Advanced Training

FUNCTIONS OF OTHER SECTIONS AND SERVICES

WELFARE SECTION

1 The purpose of the Welfare Section is to assist local authorities to discharge their civil defence functions in respect of the evacuation, reception, billeting and emergency feeding of those who are evacuated under an official scheme, or who are rendered homeless as a result of enemy action. (E.G. IN AREA OVER 1000 R/hr FALLOUT AT 1 HOUR AFTER BURST)

Functions of the Welfare Section

2 At present, the Welfare Section is organised to deal with the following functions:

(i) *Evacuation and Care of the Homeless*

(*a*) *Evacuation:*
Helping with the registration and assembly of priority classes for evacuation, providing escorts, manning reception centres, and welfare of evacuees in billets and other special establishments, e.g. hostels or homes in reception areas.

(*b*) *Care of the Homeless:*
The general care in temporary accommodation of persons who, owing to hostile action or a threat of hostile action, are made homeless or leave their homes, or are refugees or persons repatriated from abroad, until such time as they can be billeted or otherwise rehoused.

(*c*) *Billeting:*
Helping with billeting of evacuees, homeless persons and other classes.

(ii) *Emergency feeding*

(*a*) Feeding the homeless in rest centres, reception centres and at other emergency feeding centres;

(*b*) feeding householders whose normal feeding arrangements have been disrupted through enemy action;

(*c*) feeding billeted persons who have no facilities for or who are unable to feed themselves.

Emergency feeding may also be required for refugees or persons repatriated from abroad.

Organisation (England and Wales)

3 The organisation of the Welfare Section is based upon a Welfare Section Centre which will be set up in each Sector area, and all members of the Section within the Sector area will constitute a company. The company will be broken down into parties. Where some members of a party are assigned to a particular task, they will constitute a detachment, under a Detachment Leader. The numbers in a detachment will vary according to the need. A Senior Welfare Section Officer will be in charge of the Welfare Section Centre and the company, and a Welfare Section Officer will be in charge of a party of that company.

4 The Welfare Section Centre should be set up as close to the Sector Post as possible (it might be in a Rest Centre if it were close to the Post) and there should be close co-ordination between the Senior Welfare Section Officer and the Sector Warden in all operational matters.